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24 September 1984

Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

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WORLDWIDE REPORT

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CONTENTS

FIRST MINI NUCLEAR REACTOR DECLARED OPERATIONAL

OW011530 Beijing XINHUA in English 1438 GMT 1 Sep 84

[Text] Beijing, September 1 (XINHUA)--China's first mini nuclear reactor was declared operational at an appraisal meeting which closed here today. It was designed and manufactured by scientists of the Atomic Energy Institute of the Ministry of Nuclear Industry. The reactor, which went into test operation last March on the outskirts of Beijing, is the second of its kind in the world; the other is in Canada.

Using enriched uranium as fuel, the reactor produces a neutron flux of 1,000 billion per square centimeter and thermo-power of 27 kilowatts. It is at the service of scientific research institutions and production departments. It handles several dozen research items every day, consuming fuel valued at less than one yuan (50 U.S. cents). The reactor can be widely used for research into physics, the environment, earth science, medicine and archeology, as well as in industry and agriculture.

CSO: 5100/4138

BRIEFS

GUANGDONG NUCLEAR PLANT CONSTRUCTION CONTINUES--The first-phase construction of the Guangdong nuclear power plant, the first nuclear power plant in China, is making headway. Negotiations for various contracts have been smoothly carried out. The Guangdong nuclear power plant is jointly invested, built, and operated by the Guangdong Provincial Nuclear Power Investment Company, Ltd, and Hong Kong Nuclear Power Investment Company. The nuclear power plant will generate 10 billion kilowatts of electricity annually, equivalent to that generated by a thermal power plant with a capacity of 2 million kilowatts hours, but it will consume 6 million metric tons of coal less than the thermal power plant does. When completed, the nuclear power plant will not only supply plenty of electricity to Guangdong Province and the Hong Kong area but also provide useful experience and technology for building other nuclear power plants in China. The construction period of the Guangdong nuclear power plant is planned for 6 and 1/2 years. Formal operation of the first generating unit is scheduled in early 1991, with the second generating unit scheduled for July of the same year. [Text] [OW020958 Beijing Domestic Service in Mandarin 1200 GMT 1 Sep 84]

CSO: 5100/4137

PROBLEMS OF COUNTRY'S NUCLEAR POWER PROGRAM EXAMINED

Montreal LA PRESSE in French 18, 19 Jul 84

["Text" of statement prepared by Ronald Babin, Paul Berleur, Jacques Boucher, Gordon Edwards, and Jean-Guy Vaillancourt, members of the joint committee of the Tournesol [Sunflower] Alliance and the Nuclear Monitoring Group]

[18 Jul 84 p 7]

[Text] An Atomic Energy of Canada, Limited (AECL) full-page advertisement in LA PRESSE on 1 February 1984 vaunted the merits of Canada's nuclear power industry. AECL claimed its CANDU [Canadian Deuterium Uranium] power reactor concept was an indisputable economic and technical success that has contributed greatly to Canadian industry's upsurge and enhanced Canada's international image.

A careful examination of the actual facts brings out the deceptive character of this advertising campaign. Once again, AECL has failed to tell the Canadian people the truth.

The history of Canada's nuclear power industry is replete with scandals and miscalculations. Before examining some of the latter that have occurred in the 1980's, it is appropriate to recall the following well-known incidents dating back to the 1970's: radioactive contamination of the city of Port Hope, bribes given to promote the sale of CANDU reactors to South Korea and Argentina, the loss of $130 million [all monetary amounts in this statement are Canadian dollars] on this sale to Argentina, the tripling or quadrupling of construction costs, mishaps with the Laprade heavy water power reactor, and lastly the Canadian government's participation in the formation of an unlawful international cartel of uranium producers. Today, this list continues to grow longer as we perceive this industrial sector's increasing instability characterized by mounting dangers and exorbitant costs. To convince oneself of this, one need only take a quick glance at a few current events in the nuclear power field.

A recent accident at the Pickering central station necessitated shutting down that facility and led to the discovery of cracks in its reactor cores requiring repairs costing hundreds of millions of dollars. Also noteworthy is the occurrence of radioactive contamination in northern Saskatchewan, and

the recent plan to modify permissible radiation standards.

It should be noted that because the nuclear power industry in Canada is primarily in the public sector, the taxpayer is the one who foots the bill, takes the risks, and assumes liability for damages. Protected by the government from the vagaries of the market place, AECL is trying desperately to sell its CANDU power reactors while continuing to squander millions of taxpayer dollars without any assurance of profitable returns. Under these conditions, it is logical to question whether continuation of the "nuclear adventure" is worth the candle and whether we are not sinking astronomical sums of public money into an industry that is meeting reverse after reverse on both the technical and economic level.

The Pickering-1 and Pickering-2 power plants have been shutdown for repairs since the summer of 1983 because of a structural defect in the cores of their reactors. Cracks were found in the pressure tubes containing nuclear fuel. Ontario Hydro reports that it will have to spend another $700 million to replace these fuel rods and have them back in operation by 1987. These repair costs will ultimately increase charges to customers. Ontario Hydro has already proposed a rise of 9.1 percent in its electric service rates for 1985. In addition, inasmuch as the Canadian government owns 33 percent of Pickering's first four reactors, taxpayers will again have to pay the bill, thereby subsidizing Ontario Hydro one more time.

Ontario Hydro has reassured its customers that this fuel rod accident involves only the two shutdown reactors. For its part, AECL anticipates that one in every four of its CANDU reactors will possibly suffer ruptures of this type. As a matter of fact, what recently happened had been foreseen since 1976 when Ontario Hydro announced it intended to retube all of its reactors. This problem stems from a basic structural defect and the only surprise was the severity of the ruptures. Indeed, experts had expected a more gradual change in the tubes. Such cracking of pressure tubes will likely occur in at least 25 percent--if not 100 percent--of all CANDU reactors. This accident has reminded us that capital investments in the nuclear power sector are relatively short-lived--Pickering-1 and Pickering-2 will have operated for only 12 years--and that they mortgage our future in a way that is difficult to measure accurately. It is impossible to foresee the costs of replacing, managing, and dismantling these reactors. We can only be sure that this will demand a massive infusion of public funds. Only the arms industry can rival such a squandering of our resources.

Is it not senseless, therefore, to undertake construction of four additional reactors at Darlington, especially as each one will reportedly be 50 percent larger than those at Pickering. In this connection we must remember that Ontario Hydro already has a long-term debt of $18 billion and that this debt is increasing at a rate of $3 billion a year. Approximately 1 billion has already been spent at Darlington and expenditure of another billion is scheduled for the very near future. The total cost of this central station is expected to reach $12 billion. Quebec-Hydro has sensibly scrapped plans for building a Quebec version of the Darlington station at Gentilly, deeming that the electricity generated would be too costly and that stabilization of the

demand for electricity did not justify such an investment. In Ontario, however, everything seems to be happening as if nuclear power executives were ignoring costs and problems. They are evading the issue by taking the offensive, action made possible by numerous governmental subsidies that shelter this sector from economic crises and protect it from bankruptcy. After 40 years of existence, and in view of the nuclear sector's lack of success, we have just cause for demanding an end to this policy of continuous financial aid through capital grants, this shameless waste of public funds.

In addition to having to carry this financial burden, the Canadian public and workers in the nuclear industry are also obliged to increasingly assume a risk that is especially pernicious in that it involves the health of the public at large. In an effort to reduce certain constraints that press heavily upon them, nuclear power executives have for the past few years argued in favor of a revision of the safety standards and regulations governing permissible levels of radiation. The Atomic Energy Control Board (AECB) let itself be won over and announced in November 1983 an eventual modification of the standards that is actually tantamount to a relaxation thereof. For the first time ever, the board authorized--by invoking the principle of equal employment opportunity--pregnant women and youths under 18 to work in contaminated areas. Furthermore, the new standards stipulate that each internal organ of the human body may receive a greater amount of radiation than the currently permissible dose. There is no doubt that these changes will have negative, though hard to quantify, effects on people's health, causing maladies that will make their appearance in the future in the form of higher rates of cancer, genetic mutations, miscarriages, etc. These risks are deemed socially "acceptable" by the "nucleocrats" who bamboozle the public about such matters with ingeniously self-serving calculations. The arbitrary character of these standards is all too obvious and indicates that we cannot do without a public debate on such measures whose consequences are inevitably pernicious, even though it is still difficult to assess them accurately.

This relaxation of standards was not accomplished without resistance from interested parties. All trade unions of the nuclear power industry are absolutely opposed thereto and are bringing pressure to bear to have the November 1983 modification rescinded. In addition, they are demanding that the AECB be stripped of its regulatory powers and that a new truly public board or commission be formed that would reduce permissible radiation dose rates by 10. Lastly, they propose that the process leading to a public inquiry on this issue be initiated, a proposal which the nuclear industry categorically rejects.

This campaign waged by concerned workers, with the support of environmentalists, does not involve solely the trade unions. The Ministry of the Environment also questions--indirectly, it is true--the validity of the AECB's new standards. This ministry proposes to impose stricter limits on radioactive pollutants emitted by nuclear power plants. In certain cases--such as tritium, for example--the limits would be thousands of times more restrictive than existing controls. This divergence of views once again raises the question of the real role of the AECB which claims to safeguard the "public's interests," but which, in reality, concerns itself with those interests only after having

taken good care of the nuclear industry's interests. The recent accident at Key Lake in Saskatchewan is a case in point and an excellent example of the AECB's cavalier attitude. Lack of control and vigilance on the part of the responsible company caused 1 million gallons of contaminated water to spill and spread accidentally throughout the local environment. The company offered to clean up the affected area so as to limit the damage. But the AECB told the company such remedial action was unnecessary! Nothing could be clearer. Past and present-day examples definitely show us that the AECB tends to give the nuclear industry institutional authorization for those measures which serve the industry's purpose and ensure its expansion.

[19 Jul 84 p 7]

[Text] Despite the serious difficulties of a nuclear industry on the verge of bankruptcy, despite the obviously limited Canadian market, Ottawa continues to press for construction of nuclear power plants whose output would be sold on the U.S. market, mainly in New England. The first of these reactors would be Pointe Lepreau-2. Indeed, even though New Brunswick is plagued with a surplus of electric power and a disproportionate debt, Canada is in the process of selling it this second 635-megawatt plant with highly attractive subsidies. Atomic Energy of Canada, Limited (AECL) has already allocated $5 million for an advertising campaign designed to influence public opinion in favor of this new development, while the Nuclear Company of the Maritime Provinces has been given $10 million to enable it to solicit customers in the United States. Moreover, the federal government plans to risk hundreds of millions of dollars in support of this project which current estimates indicate will ultimately cost $2.5 billion. We are tempted to call such action criminal folly inasmuch as an internal study by the Ministry of Energy, Mines, and Resources concludes that this project has but a 50 percent chance of obtaining the necessary customers.

With this project, Ottawa hopes to kill two birds with one stone. First, the project constitutes a trial balloon for a more extensive nuclear power plant construction program whose output would be exclusively for export to the United States. A successful program in New Brunswick would establish a precedent that would facilitate adoption of a similar program in Ontario. This would then enable Ottawa to compete more intensely with Quebec-Hydro for the electricity export market, thus weakening the provincial electric power company that has been most effectively resisting Ottawa's energy strategy. Ottawa is seeking to centralize the energy decision-making process by: strengthening the nuclear industry which it dominates; increasing its purchase of interests in the energy sector through its 1980 "Canadianization" policy [National Energy Program]; the major role it has assumed in the development of new enery deposits (Alberta, Arctic, Hibernia, and Beaufort Sea); and its more than 40 percent interest in the new Nuclear Company of the Maritime Provinces, a consortium of Ottawa and the three Maritime Provinces (Prince Edward Island, New Brunswick, and Nova Scotia).

Ottawa reckons that the specter of competition for electricity exports to U.S. markets could prompt Hydro-Quebec to modify its development plan to incorporate nuclear power plant construction. Such was the thrust of the step taken by AECL Chairman Robert Despres in Montreal recently when he suggested that such

power plants be earmarked strictly for exporting electricity to the United States. At the present juncture, Quebec would, in fact, become the Canadian nuclear industry's sheet anchor. Steps are also being taken to still criticism alleging that this technology is mainly Ontarian. Such steps have included the following since 1982: the opening of an AECL office in Quebec, the promise to establish a research center at Varennes, and an agreement between AECL and the Hydro-Quebec Research Institute (IREQ). AECL hopes to increase its presence in Quebec as a means of saving the nuclear power industry. Unfortunately, Hydro-Quebec is patently reluctant to take this dead-end course. It objects to the fact that this campaign has been made possible by generous benefits meted out by Ottawa and, therefore, paid for by all the taxpayers, while other sources of electric power like James Bay have received no federal financial assistance.

Whether it be in New Brunswick, in Ontario, or in Quebec, such a plan to rescue the nuclear industry cannot be implemented without a massive infusion of public funds. The negative effects of such capital investments will be quickly felt by taxpayers as a whole and by small consumers of electricity who will, once again, be asked to foot the bill. In this way, risks and costs will be socialized to obtain profits exclusively for the vendors of nuclear power equipment and services.

The profitability of such a nuclear-generated electricity export program is doubtful to say the least. The electricity market in North America is saturated at the present time. New England remains one of the only two American regions still inadequately equipped with electric power generating plants. But will this still be the case 15 years from now? The New England region is bordered by states that also are trying to sell surplus electricity. This competitive situation is unfavorable to sellers and favors U.S. buyers who can, therefore, make prices drop. This situation offers a good source of profits for U.S. electric utilities that do not have to build new generating facilities. As middlemen, these utilities would buy cheap electricity and then resell it at a very high price to their own customers. Such an arrangement would also be a factor conducive to the creation of new industries in the United States rather than in the exporting [Canadian] provinces that likewise need new industries.

To the unquestionable economic risks of such a venture, we must add such environmental hazards as nuclear accidents that are always a possibility, various radioactive leaks, and the unresolved problem of effectual storage of radioactive nuclear waste. All of these hazards necessitate additional latent expenditures the magnitude of which it is difficult to predict in monetary terms as well as in terms of their impact on public health. All that we do know is that these expenditures amount to billions of dollars.

The time has come to yield to the fact that nuclear power development is a monumental failure and that this definite situation is not simply linked to the economic recession but stems from the nuclear power sector itself. If it were otherwise, how then should we interpret the fact that the presidents of Ontario Hydro and Hydro-Quebec have both said they did not think any new nuclear power

plants would be ordered in Ontario and Quebec between now and the turn of the century? In a recent interview Hydro-Quebec President Bourbeau even acknowledged that he could not offer a single good reason for operating the Gentilly-2 plant except that it was hard to forget the $1.5 million already invested, and also that operating the reactor prevented it from becoming corroded.

We must face up to reality. It has become evident that the Canadian nuclear sector is besieged with major technical difficulties, has never been economically successful, and seriously threatens the environment and public health. It also has harmful effects on the international level by contributing to the proliferation of nuclear weapons, the squandering of resources, and the strengthening of Rightist regimes. But that is another subject which we must go into again some day. Moreover, it must be realized that this sector of activity, a product of the World War II atomic weapons production program, no longer has the support of the Canadian people. Ever since 1979, Gallup polls have consistently shown that the majority of Canadians are opposed to the expansion of nuclear power.

It is time to cease squandering our financial and human resources in expanding and maintaining the nuclear industry. A country is not developed by sacrificing all to the production of electriticy or energy. We know full well that we can do more and better with less. This latter approach and not nuclear power, is the way of the future. Wanting to perpetuate the wasteful practices of the relatively abundant postwar years and continuing to imagine that it is profitable to produce nuclear energy, is not an acceptable vision of progress. It is rather the manifestation of the dominant technocratic utopia's irrational side.

The time has come to make a sharp turn toward dismantling a dangerous and dead-end industry. In Quebec, we could start by dismantling the unfinished Gentilly-1 power plant and thereby gain experience and proficiency that would be useful for such type of operations in the future. The dismantling of Gentilly-1 would provide a smooth period of transition in easy stages for employees in the nuclear power sector who could be retrained for jobs in other energy sectors. Ontario took this approach when it recently closed its Douglas Point central station, decided to dismantle it, and began developing the robotic equipment required for such an operation. Why not do the same in Quebec? Even Pierre Fortier--former president of CANATOM who has since become a member of the House of Commons from Outremont and is a liberal critic of energy matters--acknowledged the common sense of such a course of action at the 22 September 1983 meeting in Quebec of the Parliamentary Committee on Energy. He did this even though he remains an ardent advocate of nuclear power.

The alternatives we propose can also serve as subject matter for a public debate on energy issues and their economic repercussions. These alternatives have the following objectives: energy conservation, energy efficiency, and development of renewable and nonpolluting sources of energy. Such energy options have already proved themselves despite the limited resources devoted to their development. With the political will to pursue this course of action, we will not have to wait long for tangible and telling results. Instead of

squandering our resources, a practice which nuclear power implies, we prefer the moderate and calm approach to energy. In every medium- and long-term respect, we would be sure winners and, in the meantime, nuclear power technicians could devote their energies to the task of repairing the damage already inflicted upon the environment and ridding us of the immense accumulation of noxious nuclear wastes.

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CSO: 5100/2589

LUTHERAN STATEMENT ACCEPTS NUCLEAR DETERRENCE PHILOSOPHY

Vancouver THE WEEKEND SUN in English 7 Jul 84 p D7

[Text] TORONTO (CP) — Faithful to Lutheran theology, which accepts the concept of a just war, North America's largest Lutheran church has overwhelmingly adopted a statement that accepts nuclear deterrence as a "lesser of evils."

Delegates to the three-million-member Lutheran Church in America's biennial convention voted 557 to 62 Thursday to adopt the social statement, entitled Peace and Politics, which maps out church positions on world peace.

While condemning possession of nuclear weapons as a permanent policy, the statement acknowledges that "nuclear deterrence remains expedient at the present time as the lesser of evils. Yet evil it is and evil it remains."

The 23-page statement, the 18th adopted by the Lutheran Church in America since its formation in 1962, was two years being drafted by a team of Lutheran staff and theologians.

It was praised during the convention as a realistic approach to present global politics and a statement that avoids sentimentality and easy moralism.

Despite the overwhelming vote in favor, debate at the convention indicated wide differences of opinion. On Wednesday, a proposed amendment to the statement that would have rejected the deterrence philosophy was narrowly defeated 354-319.

Another statement recognizing Canada as an important emissary of peace was adopted by the convention as part of the peace and politics statement at the request of Rev. David Pfrimmer, director of church and society for the LCA-Canada section.

"This crowded and dangerous world must discover non-violent ways both of managing and moving beyond the many deeply rooted antagonisms which divide peoples and states," the statement says.

It calls on the superpowers and their allies to forge "more stable and less evil" means of building peace.

"Peace building is a constructive enterprise having many aspects," the statement says. "A vital role is played in this context by nations such as Canada in offering their good offices for the mediation of conflict and the pursuit of peace."

While the statement refers to Lutheran theology's acceptance of the concept of a just war, it asks Christians to consider whether any nuclear exchange could meet the criteria that would justify it.

Some Lutherans have criticized the statement for failing to take an unequivocal stand against the implied threat to use nuclear weapons, while others believe the United States should achieve nuclear superiority.

Rev. Robert Binhammer, president of the LCA-Canada section, says the statement strengthens the postion he and other church leaders took when they presented a brief to former prime minister Pierre Trudeau, encouraging his peace efforts.

"It is a clear theological rationale for what we are about," Binhammer said. "We have to have some kind of freeze before doing away with arms altogether."

He said the Trudeau brief did not advocate unilateral disarmament.

CSO: 5120/3

BAN ON NUCLEAR COOPERATION WITH PAKISTAN MAINTAINED

Toronto THE GLOBE AND MAIL in English 19 Jul 84 p 10

[Text] ISLAMABAD (CP) — Canada will continue to avoid nuclear cooperation with Pakistan unless that country meets Canada's conditions, a senior External Affairs official said yesterday.

De Montigny Marchand, deputy minister for political affairs in the External Affairs Department, was speaking to reporters at the end of three days of talks with senior Pakistani officials.

"We . . . compared notes on our respective stands . . . and we were led to conclude that it was very difficult to come to any (nuclear) agreement," Marchand said.

Canada supplied Pakistan with its lone Candu nuclear reactor, which became operational in 1972, but cut off fuel and spare parts for the plant in 1976.

Canada's policy since that time has been to provide nuclear technology only to those countries that adhere to the nuclear non-proliferation treaty or accept safeguards. Pakistan is not one of those countries.

In his latest remarks on the issue, President Zia ul-Haq said recently that Pakistan has neither the desire nor the means to use its limited nuclear program for military purposes, although it is believed to be capable of producing a nuclear weapon.

It would take at least 20 years for Pakistan to achieve that because of the economics involved, the President maintained in an interview with a U.S. newspaper.

Mr. Marchand ducked a reporter's question about whether Canada believes Pakistan has the ability to make a bomb.

"That is not the point," he said.

Mr. Marchand said, however, that Pakistan is entitled to pursue its nuclear program.

CSO: 5120/3

ONTARIO HYDRO INCREASES SECURITY TO MEET IAEA STANDARDS

Toronto THE TORONTO STAR in English 10 Aug 84 p A3

[Article by Bill Walker]

[Text] Ontario Hydro is being forced to spend $70 million on a security system to protect its nuclear reactors from possible terrorist attacks.

Under new security regulations, Hydro will be able for the first time to instantly detect intruders at nuclear stations, Hydro vice-president Bill Morison said yesterday.

The Atomic Energy Control Board proposal for tighter security measures was approved by the federal cabinet this year. The board, the government's nuclear regulatory agency, has set a Dec. 1, 1984, deadline for the security system to be operating.

"Certainly the threat of a terrorist attack is a reality worldwide," board spokesman Hugh Spence said.

He said terrorists would pose a major threat if they gained access to a storage bay where used nuclear fuel rests, because the fuel could be used to make nuclear bombs.

"The spent fuel could be used for explosives, if you had the expertise to put it together," Spence said.

Hydro is seeking a 9.1 per cent rate increase in 1985, partly to cover the costs of the new security system. The Ontario Energy Board will rule on the proposed rate hike later this month.

The security system includes high fences with barbed wire and detection systems, video cameras to monitor areas inside and outside reactors and additional security officers. It will also emphasize protection of the control room from where reactors are operated.

The new regulations state that fences must be chain link, be at least 2.4 metres (8 feet) high and have at least three strands of barbed wired on top, Spence said.

The system will also involve more sophisticated methods of searching people who visit nuclear stations.

Morison said that until now, Hydro had simply used average "industrial-sized" fences and unarmed security guards to protect its nuclear stations at Bruce, near Kincardine, Ont., and at Pickering.

He said that intruders — not necessarily terrorists — have been arrested in the past inside Hydro's nuclear stations at Bruce and Pickering after they had eluded security guards.

Problem at night

He said it had been a problem especially at night, when security guards could not see anyone climbing a fence on Hydro property.

But under the new system, Hydro fences will have detection systems capable of instantly alerting security guards if anyone is touching (or climbing) a fence and pointing to the location.

Once an intruder is detected, security guards will be able to focus videotape cameras on the area of the reactor site where he is located.

Spence said the new security regulations were designed to bring Canada up to the standards set by the International Atomic Energy Agency in Geneva, a United Nations agency.

CSO: 5120/3

BRIEFS

DROP IN URANIUM SALES--Ottawa (CP)--Canadian exports of uranium dropped by almost half in 1983, but Canada remains the world's leading exporter of the mineral, a senior government official said Thursday. In a sense, figures from the 1983 annual report of the Atomic Energy Control Board, showing exports falling to 3,819 tonnes last year from 7,817 tonnes in 1982, are a statistical anomaly, said the official of the energy, mines and resources department. Customers of Canadian uranium often take delivery but store their uranium at Canadian processing plants until they need it. The control board measure of exports considers only uranium that is shopped out of the country. While exports declined dramatically, shipments to foreign buyers in 1983 dropped only 12.5 per cent to 5,635 tonnes from 6,443 tonnes in 1982, the official said. Actual exports to the United States dropped to 672 tonnes in 1983 from 4,852 tonnes. But the official said the 1982 figure was inflated. When Eldorado Resources bought the Gulf Minerals share of the Rabbit Lake mine in Saskatchewan, Gulf elected to take payment in uranium. The control board's annual report also noted the occurrence of only one accident involving radiation exposure during transport of nuclear material in 1983. The accident involved the hapless pressure tubes from two of the Pickering reactors, shut down last year because of problems with the tubing in the reactor core. Two workers at Pickering received doses of 830 and 500 millirems of radioactivity. Spence said the dosages were not harmful and are well within the quarterly limits set by the board. [Text] [Vancouver THE SUN in English 6 Jul 84 p C8]

CSO: 5120/3

ENERGY UNDERSECRETARY ON FUTURE OF NUCLEAR PLAN

Buenos Aires REALIDAD ENERGETICA in Spanish Mar 84 pp 8-9

[Interview with Jorge Edgardo Lapena, engineer, undersecretary of energy planning]

[Text] Question: How will the nuclear plan and the nuclear power plants be handled?

Answer: First of all, I would like to make one comment on this. The nuclear plan will be formulated by the appropriate organizations and persons, including the president of the republic himself, who is an adviser for specific organizations in this area, obviously including the CNEA [National Atomic Energy Commission].

We in the department of energy will be preparing an integral energy plan which will therefore cover all sources of energy, including nuclear energy, with a mid and long-term vision--and thus a strategic vision--of the energy problem.

This strategic vision of the energy problem will select the mix of equipment (electric power plants, gas and oil supplies, hydroelectric power, etc.) that best suits the needs, requirements, and possibilities of Argentina's situation. We will essentially be assigning a role in the long-term energy balance to be filled by each energy source.

This mix of equipment selected will include all of the nuclear power plants, their location in our national time and space, and obviously their operating characteristics.

This demand for nuclear power plants will be used, along with the other nuclear sector demands, as input for the definition of an overall nuclear plan, to be prepared by the appropriate nuclear authorities, which will obviously interrelate and realign the energy sector.

Question: What premises will be used in handling the development of nuclear power, as a policy and as a criterion? What are the priorities before the plan is actually formulated?

Answer: As a brief summary, I will say that these premises are varied, but fundamentally they are:

a. That the definition of the number of nuclear power plants within the energy plan must be prepared with a long-term vision of the energy problem; that is, with special emphasis on the determination of the future role of each energy resource within the projected balance.

b. That the projects Argentina is to undertake--and this is valid for all projects and not just for nuclear power plants--should demonstrate their feasibility in terms of their social benefits outweighing their social costs.

c. That it is necessary to develop an energy equation in which consumption is in harmony with the available energy resources that Argentina has, with a tendency toward a reduced consumption of liquid hydrocarbons, replacing them with renewable resources, or those with a high depletion horizon.

d. That we must remember that Argentina is a developing nation which has lagged behind in many areas of its social development, and that financial and budgetary resources are a scarce asset that must not be wasted.

   All this means that we must make an effort to rationalize the entire public investment process.

e. That in the case of nuclear power plants, we have to remember the level of development attained by Argentina's nuclear industry.

Question: How is energy planning being handled by the present administration?

Answer: Quickly. A division of energy planning has been created which has rapidly brought together a highly skilled professional staff. This professional staff comes from enterprises active in the energy sector (YPF [Government Oil Deposits], YCF [Government Coal Deposits], GAS, AyEE [expansions unknown], SEGBA [Greater Buenos Aires Electrical Services], HIDRONOR [North Patagonia Hydroelectric Company], and some provinces.

And in this particular case, some experts have come from the CNEA itself, which has sent some top-level staffers to carry out pertinent studies (experts in uranium resources, nuclear fuels, nuclear power plants, costs, prospects, etc.). We estimate that during the current year we will be able to complete the General Energy Plan for Argentina. It will be an overall plan, covering all aspects of the energy issue (technical, economic, financial, and human).

Question: Will the plan include the human professional and technical resources we have in Argentina, as well as uranium resources?

Answer: Yes, it will. In this area Argentina has some major comparative advantages over other countries in our region, which must be suitably valued and used.

The formation and development of basic and applied engineering skills in Argentina, and the development and high quality of our national industry are now being translated into a strong Argentine participation in the construction of nuclear equipment.

This level of national participation--eventually autonomy--could take on even greater dimensions for our economy if we could manage to export nuclear power plant equipment and technology to countries in our region, based on their own requirements, that would be competitive with the bids from the developed world.

I believe that one job still remaining to be done in Argentina is a serious projection of the mid-term Latin American market and of the third world market in general for nuclear equipment and services.

Our uranium resources will obviously be considered, along with our other energy resources, with a strategic vision of our long-term national energy equation.

Question: Will non-proliferation treaties be signed?

Answer: The answer to that question goes beyond energy, and is thus outside of my field of competence.

Question: Don't you think that Argentina should expand its work with technologies that have military applications, but which can also be used for peaceful purposes?

Answer: Argentina's position on that issue is final, and it has been stated repeatedly by the appropriate persons. Our development of nuclear energy is solely and exclusively for peaceful purposes. But going beyond that, it is my personal feeling that the position of countries that detonate nuclear devices, claiming that these are controlled explosions for peaceful purposes, is hypocritical.

7679
CSO: 5100/2128

CNEA CHAIRMAN DENIES ALLEGATIONS OF NUCLEAR CRISIS

Buenos Aires REALIDAD ENERGETICA in Spanish Mar 84 pp 16-17

[Introductory speech by Alberto R. Constantini, engineer, chairman of the National Atomic Energy Commission]

[Excerpt] From the time I first assumed the chairmanship of this Commission until the present, we have been working to analyze and study our current nuclear policy. We have considered its essential aspects, so that we will have clearly defined goals enabling us to move without hesitation toward the future. I have found some major points of agreement between Decrees 3,183/77 and 302/79 which in their respective times defined the PNA [Argentine Nuclear Plan], and a program drafted by a group of citizens from the Governing Party, prepared in the Blanco Foundation, chaired by one of the directors of this Commission, Dr Mariano. This program clearly establishes that the Radical Party favors maintaining the PNA's six-point program. The first of these points is the nuclear power plant construction program. This has been begun, and the fourth plant was scheduled to begin in 1985. Naturally, this has suffered the same delays as the rest of the PNA, and it will be slightly postponed. Its feasibility studies are in progress now, and the selection of characteristics--a choice between one of the two which the CNEA [National Atomic Energy Commission] now has in operation, Atucha or Embalse--will be made very soon, sometime before the end of this year. Then the final studies for the Nuclear Plan's fourth plant can be made, and even with some delay, we can complete the program of six nuclear power plants scheduled to be concluded by the year 2000--the CNEA's contribution to the National Energy Program. Listed as the second point, which also coincides with the PNA, we find nuclear supplies and uranium mining, now being done through the nuclear supplies division in Mendoza province as well as in other Argentine provinces. The next points are: the concentration of uranium, and manufacture of fuel elements and of special alloys. The document also recommends obtaining zirconium sponges; and finally, there is low and high pressure testing.

This means that this program contains a proposal to do almost everything that this Commission is now actively pursuing, including the following areas. Uranium concentration: work is being done at the Bariloche Atomic Center and at the INVAP [expansion unknown]. The preparation or manufacture of fuel elements is some of the work being done using the test chamber at the Atucha Atomic Center. High pressure testing and heavy water supplies: work is in progress now at the facilities at Ezeiza, and additional facilities are being built at Arroyito in Neuquen.

The proposals also include research and development, radiation and applications of radiation, or radioactivity.

The program mentions radiological protection and safety, and finally, the training of human resources, which must be an ongoing endeavor, to meet the needs of this Commission.

In every instance, all these points in one way or another form part of the Commission's current activities. For example, research and development: through the construction of the accelerator in the Tandar Project in Constituyentes; the radioisotope work which is of concern to us, because for some quite serious reasons, we have had to halt the work that was being done at the Ezeiza Atomic Center. But its start of operation will not take much time, and the repair work is to be completed within the program, terms, and schedules set by the Commission: that is, sometime this year.

If that is the way things are, where is the nuclear crisis that the AATN [Argentine Nuclear Technology Association] is talking about, when it says that a nuclear crisis is approaching? Or, I might say, in what way is our national government giving up and stifling this Commission's work, as some opposition deputies have charged recently?

I believe that we should not expect institutions to go on forever, nor should we expect flattery for work accomplished, but I do believe that it is not fair to emphasize pessimism and to bring up subjective and illogical thoughts about the progress of something which, as in this case, might discourage this extraordinary, essential work, which affects not only our leaders and our people's development, but which is also lending a hand to all our brothers in Latin America, such as Peru, and perhaps to Colombia in the near future, by transferring technology and helping to build facilities which will be used for medical purposes. In all cases, these programs support the great cause endorsed by our president: supporting the peaceful uses of nuclear energy, to provide greater wellbeing for our people.

That is why I would like to greet the CNEA staff. I want to tell you directly that you may have absolute confidence that this Commission will continue to move forward along the same course, with the same self-assurance, with the same enthusiasm, and with the same energy as it has shown in the past few years. I want--and this is not simply a matter of personal vanity--to maintain and, if possible, even increase the prestige of this Commission. That is not an unworthy ambition for an official in public life.

And finally, I want to tell you that we are at this time working intensively to clarify and define our thoughts on nuclear policy, both internally and externally. The panel appointed by the president of Argentina, chaired by the minister of foreign relations, composed of the minister of public works and services, the secretary general of the office of the president, and Dr Jorge Sabato, has been analyzing and studying this policy. Together this panel has decided to issue, within the next few days--or define or enunciate, however you would like to say it or think about it--the policy of our national government, which will be within the outlines I have just stated, and which will serve to provide a focus. We need such a focus in order to move securely toward the destiny of greatness which our Commission needs.

Among the activities we are planning to discuss during the next few days, along with some programs you are already aware of, such as our efforts to avoid inefficiency in any form, so that we will not have a nuclear crisis as a result of the uneconomical operation of our plants, we are studying not simply the most appropriate legal or administrative system for the operation of the power plants. We are also looking into the use of our plants in the unified load distribution system. We are also studying rate structures, since it would seem at first glance that what the Commission earns from the operation of the power plants is not enough to amortize the costs of these plants, but just enough to cover operating expenses.

Naturally, it is clear that this involves accounting methods used among the different state agencies, but it is still of vital importance from a psychological point of view. For if the plants appear to be inefficient--or not tc fulfill an economic role, or if they create problems affecting the population's safety--as a report in the CRONISTA COMERCIAL says, then we will have reason to think that nuclear power plants are in a state of crisis all over the world, and consequently, in Argentina as well.

That is why we are starting to conduct these studies, in order to determine not only the value to be derived from using these plants, but also to determine the rate structure, or the economic return from the power plants. Then we will be able to fully justify their importance and necessity in our national energy program.

We are studying--and this too is not simply a personal whim of mine, but a continuation of these ideas--a program whose outlines had already been traced by the CNEA. We are considering the possibility of setting up a company to produce special alloys and at the same time, giving INVAP a share in CONUAR [expansion unknown]. We are now looking into the possibility of combining these two measures, in order to resolve the problem of capital needed for both of them.

As I said, we are working on the definition of the fourth plant. We are considering the overall plans for the building and the staff. With some of the directors of the CNEA, in this case the director of planning and the administrative manager, we are analyzing the plant's budget. This budget will have to deal with the tremendous difficulties facing Argentina, difficulties which you all know well because, obviously, in addition to our external debt we also have the great difficulty created by our internal deficit. Despite all that, we are studying ways of solving the problem so that we can slightly postpone some of the projects without impeding technological developments, without discouraging scientific innovations: in a word, without destroying the technical, scientific, and technological structures which not only have our CNEA staff created, but which have also been extrapolated outside of the CNEA's walls and spread throughout our national industry. This industry has managed to obtain training, creating a truly well developed center providing technological innovations to serve our nation's development.

For all these reasons, and also with the thought in mind that we are going to continue pursuing agreements with the universities, like the ones currently existing with the Balseiro Institute or like the ones we have with the Faculty of Engineering or the Faculty of Medicine, or the courses offered in conjunction with the IAEA [International Atomic Energy Agency] on safety at Ezeiza, we will continue to pursue the line of personal development so necessary as a step to advance the careers of researchers, innovators, scientists, and engineers, whose careers in the final analysis, are so closely linked with the CNEA.

Ladies and gentlemen, I don't want to continue talking much longer. What I do want is to convey the greetings of the government of Argentina and of its president, to whom this Commission is directly responsible. I also want to express to you my personal greetings, encouragement, and confidence in the future, and to ask you all not to allow yourselves to become discouraged. Do not think there is a nuclear crisis in Argentina, and please continue to work at the same pace and with the same vigor as you have done so far.

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CNEA PROJECTS DIRECTOR PROPOSES REORGANIZATION MEASURES

Buenos Aires REALIDAD ENERGETICA in Spanish Mar 84 pp 29-32

[Article by Jorge Cosentino, engineer]

[Text] In previous articles we have discussed the realities facing the various projects contained in the plan. A broad spectrum of the nuclear community today has expressed its concerns about the impact, termed decisive, that a budget cut in the 1984 fiscal year would have on the plan's continuity. We feel it is appropriate to restate the importance that we attach to properly correcting the defects in the organization of this sector which the Constitutional Government has inherited, despite the "halo of perfection" with which the previous administration has tried to surround it. A careful determination of the role which the private sector should play and a realistic and pragmatic focus on the topic of international safeguards are also issues of similar importance. In this article we will discuss the reorganization of the CNEA [National Atomic Energy Commission], an issue that generally receives fairly little attention, despite its relative importance. We believe that a year of restrained investments--that is, no less than the investments made during the 1983 fiscal year, but used to resolve the problems we have mentioned--will in the end, and in the long run, be more beneficial than a year without economic restraints, but in which, either because of a lack of understanding of the problem, or because of strong pressures to continue project developments, no attempt is made to resolve these issues, which clearly have a major impact on the economic effort required of the state.

Some Reflections on the CNEA's Reorganization

The constant evolution of the Nuclear Plan, ever since its start in the year 1950, has entailed different phases, each of which demanded a structure appropriate for that particular time.

We may well wonder whether the structure in use now is the one most suitable, not just for present-day needs, but also and above all for the foreseeable requirements of the near future. The previous articles on the nuclear power plants, CNA [Atucha Nuclear Power Plant] I, CNE [Embalse Nuclear Power plant], CNA II, the CN IV project, and ENACE, S.A. [Argentine Nuclear Power Plants Enterprise], support our conviction that such is not the case. This opinion is also backed by the difficulties that each of these projects has encountered as a result of the CNEA's not having undertaken the suggested corrective steps at the right time. Even so, thanks to its initial impetus, the plan has attained a level of development that earmarks it as atypical in Argentina's technological situation, because of its relative efficiency. Still, the economic effort which the community has supported, especially in recent years, has given it the right to demand a level of consolidation that it still has not achieved. And as a result, this makes it more vulnerable to eventual and severe budget restrictions. Correcting this problem is essential in order to protect it from such ups and downs and to provide it with goals compatible with the nation's economic status.

I The Situation Inherited

While the CNEA's activities extend beyond the framework of nuclear power plants--no matter how attention-getting these plants may be from a budgetary point of view--a review of the fundamental problems these plants suffer from will provide a suitable way of trying to introduce more general corrective measures in the CNEA's organization. A diagnosis of the situation as it was inherited would indicate the following:

a. The lack of a human resources policy which, by including a suitable and harmonious labor system, would help to improve jobs in this sector. That would facilitate better development and participation of the human resources available.

b. The lack of clear, long-term, and carefully evaluated objectives, which would facilitate and help to promote and maintain the motivation and unity of the staff's efforts.

c. The lack of sound business management practices which would use what is produced to provide suitable compensation, earning real resources so the sector could finance its own expansion.

d. The lack of proper handling of suppliers, both Argentine and foreign, so that projects could be contained within cost and execution term guidelines in harmony with the magnitude of the economic investment required.

e. The lack of suitable management so that negotiations and contract deadlines could be used as proper ways of guaranteeing an effective technology transfer to help Argentina's Nuclear Plan.

f. The lack of coordinated action so that appropriate decisions concerning the most suitable type of reactor could be made at the right time, and without wasting time not legitimately attributable to budgetary reasons.

g. The lack of a logical separation of functions between the various sectors involved, resulting in an increase in bureaucracy and infrastructure, leading to the duplication of efforts and misuse of the human potential available.

h. The lack of ongoing and effective actions designed to prevent the decline of safety standards, with which the facilities in operation must always comply.

The preceding summary is an attempt to conceptualize and list the various mistakes exposed in these articles, which the later course of events has corroborated: the emergency measures taken in relation to the CNE's operating personnel have only emphasized the lack of labor planning which, by eliminating inequities, could bring harmony to this sector; the out-of-date rate structure for the CNA I which can cover no more than 70 percent of its costs, even though it is the most economical plant in the system; the incorrect methods used for economic transactions which have hastened the decline of the nuclear sector, and helped to advance other alternatives; the lack of foresight shown in not presenting appropriate studies and proposals at the right time (because of this, the energy provided by the CNE during all of 1983 was assessed at only 25 percent of its true value; additional delays in the CNE and a contract commitment which, despite the effort it entails for the nation, was limited merely to a commercial focus without opening up, as would have been advisable, possibilities for greater access to the technology considered most suitable for Argentina's Nuclear Plan;

significant pending investments required for the completion of the CNE, even after contractual acceptance; the excessive number of personnel involved in the commercial operation of the CNE, both its own staff members and employees of subcontractors and of prime contractors, with little experience, and out of any proportion with what is needed now, 10 years later, for the CNA I; delays in the CNA II, so that at the end of 1983 when 54 percent of the project was due to be completed, according to the original schedule, its physical status was less than 33 percent complete; significant cost overruns in the CNA II, beyond the $US 1,578 x 10^6 (December 1978), announced in October 1979, in support of the decision to proceed with this project; results which in the end, and after nearly 2 and 1/2 years of work, led to a feasibility study of the CN IV: a major delay introduced because of this study beyond the forecasts for the CN IV contained in Decree 302/79, not in any way attributable to budgetary restrictions; the first fatal accident in an Argentine reactor, etc.

The common denominator of the preceding list can be found in an organization that has gradually been juxtaposing the responsibilities for general planning, for determining policies and interinstitutional relations, with activities of an executory nature. This situation can be summarized as follows:

General planning and setting of long-term policies, based on forecasts, but without sufficient backing and consensus; execution in a centralized manner, characterized by a lack of essential operational flexibility.

As we said earlier, these conclusions are based on the nuclear power plants, but they may still be generically extrapolated to all of the CNEA's activities.

In fact, the CNEA operates using administrative methods and mechanisms typical of central administration agencies, or in any event, at least of those with political responsibilities. However, it also bears important responsibilities for programs and jobs of an executory nature, for which it does not have suitable resources. For a variety of reasons, the problem has not been addressed in an integral manner; people have looked for palliatives based on different forms and methods, depending on the emphasis given by the various officials who at one time or another have attempted to solve each particular problem in isolation, acting within a general context. That is why businesses have been created with private participation; corporations have been set up with a majority of their stock held by the CNEA and

with minority private participation; state companies with a majority or all the stock held by different provinces, and special bylaws, ensuring total or partial control by the CNEA.

Aside from this absence of any clear definition between duties of a political nature and executory jobs which we will call a "lack of vertical definition," we should note that the CNEA's structure also suffers from what we will call from here on forward a "lack of horizontal definition," reflected in the two following situations affecting responsibilities of an executory type.

They are not at present organized in accordance with the best and most functional type of separation, but in some way like something left over from an earlier evolutionary process that does not necessarily coincide with current priorities. In fact, some sectors are accorded a great deal of importance, based on their original significance during the early phases of the CNEA's development.

In general, they do not have the autonomy of action that is now indispensable and they depend on centralized services to fulfill their responsibilities. This situation restricts their dynamism.

II Suggested Measures

The situation as exposed in the executory field requires two types of measures if it is to be resolved:

a. Some to redefine the scope of action of each executory area.

b. Others designed to give each redefined executory area the maximum possible operational autonomy within the CNEA's central organization, as a first step toward the implementation of new organizational plans.

These reorganization measures on an executory level, even though fundamental, will not be sufficient in themselves, since the CNEA's administrative and management mechanisms will not allow it to act in specific cases with the necessary operational flexibility. This reorganization, still maintaining its position within the CNEA's present structure, would constitute only the first phase. A second phase designed to give the proposed executory areas an essential operational flexibility should follow as the immediate and inevitable next phase. This second phase

would then have to deal with the reorganization of activities of a political and executory nature when the vertical reorganization has also been carried out. This aspect is also an essential complement of the previously cited measures. The results of "Phase 1" would produce an organization reflecting:

a. Reorganization of responsibilities of a political nature and of an executory nature ("vertical level").

b. Reorganization of executory duties ("horizontal level"), both in:

c. Redefinition of areas and responsibilities, and:

d. Decentralization of support duties (but always within the CNEA's central structure), while attempting to assign to each sector meeting the necessary requisites the maximum possible operational flexibility.

When Phase 1 has been completed, the CNEA's general structure should fit the following general guidelines:

a. Overall responsibility for the Argentine Nuclear Plan would be assigned to the CNEA.

b. The CNEA would keep its direct dependence on the president of Argentina and would be administered by a board of governors, one of whose members would serve as chairman.

c. The members of the board of governors would be appointed by the national executive, preferably with the participation of the Senate.

d. The board will keep for itself duties of a political nature and general planning.

e. Actions related to management control of duties of an executory type, though the latter may be carried out within the CNEA's central administration or by CNEA companies or companies partially owned by the CNEA.

f. Actions related to the safety of nuclear facilities, their licensing, the granting of permits for the

construction, installation, or operation of these facilities, and equivalent actions for the use and application of radioisotopes and radiation.

g. Responsibilities related to international relations, dealings with institutions of an equivalent stature, and those related to safeguards.

h. Duties related to the overall financing of the CNEA's activities, or the setting of rates and prices for supplies and services it provides.

i. A general manager should be responsible to the board of governors for the executory tasks performed within the CNEA's central administration.

j. A business committee, composed of CNEA representatives in its firms, would be responsible to the board of governors for companies with stock held by the CNEA.

k. The board would be assisted in the preparation of nuclear policies by an advisory panel on which sectors of the PEN [National Executive Body] and of the Argentine business community involved in such activities would be represented.

l. The official sector of the advisory panel would be composed of representatives of other state organizations involved with the conception and implementation of the nuclear plan (for example, the department of energy, ministry of the economy, department of science and technology, ministry of RREE [expansion unknown], ministry of education, department of industry, and department of mining).

m. The private sector on the advisory panel would be composed of representatives of private industry which deal with the creation or implementation of the Nuclear Plan (Argentine Chamber of Construction), engineering groups, Chamber of Metallurgical Industries, AATN [Argentine Nuclear Technology Association], Argentine Chamber of Consultants, etc.).

Since the board of governors should act as a collegial body, it would be advisable that, as a whole, its members represent the principal areas of the CNEA's activities (for example, nuclear

power; nuclear supplies; radioisotopes and radiation; research and development, and training of human resources; technology transfer and promotion of Argentine involvement in technology; financing, etc.).

The preceding ideas are related to the formal structure suggested for the CNEA. In addition, it is clear that the CNEA authorities must have the power to set up temporary structures to improve the coordination of developing activities, and that this coordination will be all the more important the more the tasks left to the proposed general management are separated from those assigned to different enterprises or to another type of satellite organization that might eventually be created. This coordination is important for all these areas, but coordination between the research and technological development areas is truly essential in order to make proper use of the work being done. This is not intended to downgrade the indispensable coordination of these two sectors together with the areas of nuclear supplies and nuclear power plants, and also the absolutely top priority coordination between the latter two areas.

After Phase I has been completed, in terms of the reorganization of the executory jobs left under the CNEA's central administration, there should be an analysis of the wisdom of transferring some or all to the sphere of a business committee. The appropriateness of each such transfer would be determined by taking into account the necessity for such a step, the level of integration achieved by the sector, the economic magnitude of the responsibility involved, and any other factor related to the plan's general policy. These eventual transfers would become a characteristic feature of Phase II, and based on the current situation, might proceed gradually as follows:

a. An enterprise responsible for the planning, construction, and operation of nuclear power plants. This enterprise could include in its capital, and in the composition of its board of governors, a progressively increasing participation by the ENE [National Electricity Enterprise], once that has been set up. The transition of capital stock from the CNEA to the ENE would be based upon the dates of start of construction and of start of commercial operation of the three nuclear power plants scheduled in the program. The creation of this enterprise is considered an absolute priority for maintaining in force the ideas presented on this topic in 1976 (ENA S.E.). While these proposals were initially supported, they were later rejected (1980) because of the fear that the creation of such an enterprise might bring

about an institutional dismemberment. The creation of this enterprise would necessarily entail a reorganization of ENACE S.A., both in terms of its purpose and its stock ownership structure.

b. An enterprise responsible for nuclear supplies. In particular, it would handle the provision of the first enterprise with fuel elements and the heavy water needed for the program. It would be responsible for all of the industrial phases of the fuel cycle, including exploration and prospecting. This initiative, despite its importance, has not in the past received as much attention as the first case cited, and as a result, it would still require a more extensive period of maturation.

Each of these enterprises would have its own board of governors. If the current legislation is not changed, it is felt that the firms which do not include private stock participation, as would be the case of the first of these, should be organized according to the provisions of Law no 20.705.

Though unlike the two previous cases that are believed to call for rapid implementation, and definitely need a business type of organization, the following sectors also require greater operational flexibility. Nonetheless, this could be achieved either by a business structure or by a modification of the CNEA's mechanisms. This is an option still requiring detailed study.

a. A sector responsible for radioisotopes and radiations. This sector would be responsible for all phases related to applications and production of radioisotopes and sources of radiation. The various machines designed exclusively or as a priority for these purposes would be under its control. It would also handle the promotion of applications of its products within Argentina, especially in disciplines which have not yet met with incentives from the private sector.

b. A technological developments sector. Its responsibility would be to cover the intermediate phase between basic research and development and the phase of application and industrial production. A typical area of application would be the planning, construction, and initial operation of pilot plants, until the data needed for the industrial application phase has been obtained. This sector would be responsible for those pilot facilities which, as they are key elements in the development of the nuclear plan, can not be left totally to the nuclear supplies enterprise.

c. Research and development sector. Its area of application would be to organize those areas of research and development that will give the rest of the plan the necessary technological independence required to achieve the objective of self-sufficiency, in a manner compatible with the nation's possibilities and the preservation of its sovereignty.

d. Finally, a special projects sector should be established. Within this group could be represented other areas of the state that are directly interested in these developments or projects. To the extent possible, this sector would use the services of the other sectors or enterprises, in an attempt to avoid any duplication of efforts, and it would be responsible for the coordination of possibilities or the development of others that do not yet exist.

If the PEN or the legislative authorities were to decide to set up a parliamentary mechanisms to monitor the CNEA's activities, an initiative that is considered particularly appropriate, the ideas stated in this article would have to be adapted as a result; at a minimum, there would have to be introduced, at the board of governors level, a sector to handle coordination with the Bicameral Commission that would be established in such a case.

The implementation of all of this would be complemented by the promulgation of a Nuclear Law that would set the major lines, priorities, objectives, and resources for the completion of the Nuclear Program, thus legitimizing activities that the CNEA carries out in fact, but without any formal backing.

III Implementation Sequence

Given the wisdom of introducing the suggested changes as soon as possible, it is felt that the first step the PEN should take is to immediately establish the board of governors. Once this board has been created, it would then handle the reorganization of the CNEA, and at the same time, it would draft legislation for the Nucler Law mentioned above, which would provide the legislative support required for this reorganization. It is felt that this sequence would have advantages over another type of sequence giving priority to the promulgation of the Nuclear Law, and only appointing the board of governors later.

The development of Phase II, once the Nuclear Law is in effect, could result in a tendency to decrease the number of executory activities handled by the CNEA's central administration, with a

comparable increase in those handled by the enterprises. This could go so far as to reach a total transfer at some point in time. At that hypothetical moment, it would be necessary to decide if the conditions might then be ripe for transforming the CNEA under its board of governors into a department of state of nuclear energy. Under Phases I and II, that would be the duty of the chairman of the board of governors. Such a department of state would have different divisions which would in some way correspond with the principal areas of activity covered by the remaining departments of the CNEA (for example, nuclear power, nuclear supplies, radioisotopes and radiation, research and development). The activities listed for Phases I and II as the responsibility of the board of governors would as a result then depend on that department of state of nuclear energy and on its divisions.

One special case, though, is the sector related to the licensing of nuclear facilities. In this instance, while an important step forward is being taken by changing the present situation and placing it under a board of governors, in the near future it will certainly not have a sufficient degree of separation, and so its relocation will have to be considered, moving the sector of inspections to another state sector, still more remote from the executory responsibilities involved with such facilities.

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NUCLEAR WASTE LEGISLATION TERMED NECESSARY

Buenos Aires LA PRENSA in Spanish 10 Aug 84 p 8

[Article by Carlos A. Barbosa: "Nuclear Waste in Argentina"]

[Excerpts] The nation's president announced recently that the administration would submit a nuclear power bill to Congress. The bill should take up the issue of nuclear waste, and it therefore behooves us to clarify certain major aspects of this problem in Argentina. We will discuss in particular here the highly radioactive waste that results from the reprocessing or final disposal of the fuel rods used in nuclear power plants.

The handling of spent (irradiated) fuel is a serious matter, with major international ramifications in warfare, energy and the safety of individuals and the environment, and in our case a solution will be costly.

Since irradiated fuel rods have been accumulating in the storage tanks at the Atucha I plant and since more rods will begin to be produced and stored at Atucha I, Embalse and Atucha II in 5 years, we must plan on having solutions in place by around 1995 if we want to alleviate the problem that we are bequeathing to future generations of Argentines.

This article proposes the ultimate disposal of the fuel in stable geological strata isolated from the biosphere. This is the only viable solution for Argentina. Even though no country has as yet attempted it, it must be tried, to which end legislation is necessary.

How Much Waste Will We Have?

As of mid-1984, more than 350 tons of metallic uranium spent fuel have accumulated, largely from Atucha I. Except for the fuel used at Embalse, all of it is contained in some 3,600 cylindrical tubes 6 meters long and 10 centineters in diameter.

Atucha I's storage capacity is 1,400 tons, including the 1,000-ton expansion built between 1978 and 1982 and designated as the second storage tank room.

The Embalse power plant, with fuel rods 50 centimeters long and 10 centimeters in diameter, has a storage capacity of 890 tons, which went on line during the first few months of 1984.

The Atucha II plant will have fuel rods of the same geometry as Atucha I and is being built with a 680-ton storage capacity.

If we assume that in the coming years these three nuclear power plants generate electricity at the same average load as Atucha I did until 1983, then the deposits will be full in 1994, 1997 and 1999 for Embalse, Atucha II and Atucha I, respectively. Our estimate is that towards the close of the next decade we will have accumulated 3,000 tons of irradiated fuel, that we will producing 18 tons a month and that we will need additional storage capacity to continue generating electricity at nuclear plants.

Final Considerations

If our goal is to resolve the problem of nuclear waste, the nuclear power law must not be a proclamation of the rights of the government and the CNEA [National Commission for Atomic Energy] based on the importance of nuclear activities. That would be a step backwards.

The nuclear power bill must assign authority and responsibility and set deadlines for government bodies to formulate, issue or reassess the applicable standards and to implement solutions to the problem of nuclear waste.

A nuclear regulatory and watchdog agency independent of the CNEA must be created by legislation and its responsibilities defined. And what we need in general is legislation providing for broader public involvement in and knowledge of nuclear activities.

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CONSTANTINI ON FUTURE COURSE OF NUCLEAR PLAN

Buenos Aires ENERGEIA in Spanish No 46 May 84 pp 47-48

[Interview with Alberto Constantini by Luis Fernando Calvino; date and place not given]

[Text] [Question] You took over at the CNEA [National Commission for Atomic Energy] at a time when the lack of understanding that democracy brought had caused a shift in public opinion regarding nuclear power. Six months into your term, do you think that, as some people say, the CNEA is ungovernable? Do you think that the sector needs a sweeping overhaul?

[Answer] The CNEA might need minor adjustments but not a sweeping overhaul. It so happens that the CNEA is different from the various agencies that I have had the opportunity to get to know over my 40 years of public service. Because of its activities, which are both scientific and industrial, and as a result of its role as a technological innovator, its structure is necessarily different. From the outside it might seem ungovernable to some, but it definitely is not. I want to emphasize this. Its uniqueness stems from the nature of its activities; its structure includes companies in which room has been made for private enterprise. All of this must be taken into account in judging the CNEA.

[Question] The CNEA is generally praised for its continuity, in spite of our notably unstable politics. Do you think that this continuity is threatened today?

[Answer] I think that the threat exists but that fortunately there is only a remote chance of it coming about.

[Question] Do you think that Argentina's nuclear program is consistent?

[Answer] It is completely consistent with the goal of the CNEA.

[Question] What is the goal of the CNEA?

[Answer] That is a good question. To many it is solely the construction of nuclear power plants, but that is not the case. It is true that

most of our budget is earmarked for nuclear power plants, but the purpose of the CNEA does not end there. The power plants are the hub of our technological and scientific development; they enable us to put research gains to the test, but a wide range of activities are undertaken around them.

[Question] Let's say that there are the hub of the CNEA...

[Answer] We should think of the nuclear power plants as playing a dual role. On the one hand, they are extremely efficient and economical components of the national power grid, and on the other they are genuine promoters of scientific, technological and industrial development. Yes, we could say that they are the mainstay of the CNEA.

[Question] Since the outset of your term you have made it a special point to talk about the many applications of nuclear power outside electric power generation

[Answer] That is true. There are countless uses of nuclear power that could turn out to be just as important as or more important than electric power generation for the country. But for one reason or another, these applications have remained concealed from public opinion. The CNEA has failed to inform the community about these activities, in many of which it is also a pacesetter.

[Question] This is the purpose of the exposition "Atoms for Life."

[Answer] Yes, and it has been quite successful. We have been asked to bring it to several provinces, and I think that later we will make it a permanent exposition. It is for both government officials and the citizenry, and its mission is to publicize these little known uses of nuclear power, which we are going to be stressing. Some provinces, for example, have asked me if we could bring them our irradiation equipment so that they could try to prolong the life of certain items, grapes in San Juan, apples in Rio Negro. Studies are under way to determine whether food irradiation plants can be set up in the interior of the country.

[Question] You are right. These kinds of applications have not been sufficiently publicized. We know just a little bit about the applications in the field of medicine...

[Answer] Argentina is an important country in the field of nuclear medicine, and the efforts in this sphere could turn out to be even more decisive if they are combined with other sectors. This is silent but extremely important work. A few weeks ago, Dr Dan Beninson gave a lecture here at the headquarters of the CNEA on the applications of radioisotopes in the treatment of cancer. More than 200 physicians were in attendance, and the consensus was that we can expect further gains in these activities.

[Question] Nevertheless, the shadow of deep budget cuts is looming over all CNEA activities, not just the major projects...

[Answer] Look, I feel that the CNEA's efforts in 1984 and the immediately succeeding years will not be adversely affected by the cutbacks that you have mentioned. The priority projects will be completed, with smaller or larger funding. The timetable for Atucha II, Arroyito or the LPR might be delayed to a greater or lesser extent, but these projects wil not come to a standstill. I am concerned about what happens after 1990, because the decisions affecting that future must be made with enough lead time. If we do not begin building new power plants, we will be shutting down the hub around which all of the CNEA's scientific and technological activities revolve.

[Question] No one doubts that the depletion of nonrenewable energy sources is going to dictate a growing share for nuclear power in our total energy output.

[Answer] But we have to highlight this and we have 2 or 3 years to do so. As you say, the supply curve of oil, gas or hydroelectric power reserves has a clear-cut horizon. Demand is going to rise, and a heavy contribution from nuclear power will be required. If Argentina is not ready to cope with these requirements with its own technology, it will become dependent on the countries that do have their own technology. If we were concerned yesterday about independence in fossil fuels, we should be even more concerned today about technological independence in the nuclear sector. We must preserve it at all costs.

[Question] You mentioned a number of projects under way. Are these the CNEA's current priorities?

[Answer] Atucha II and Arroyito are, because of the size of the respective investments. Some other projects are less expensive and are being completed, such as TANDAR, for example.

[Question] And what about the LPR?

[Answer] We have gotten to a point at which sizable investment is no longer required. Its completion is assured, though to have it operate on a day-to-day basis it obviously needs a storage area [repositorio], which for the time being is in the study phase. Once the LPR is completed, it can operate as a research and development facility but not as a day-to-day project.

[Question] In your judgment, how big should the reactor at the fourth nuclear power plant be?

[Answer] One of the parameters for judging nuclear power is how economical the reactors are. From this standpoint, I would not hesitate to opt for a 600 megawatt reactor. It has also been argued, however, that a smaller one could be better suited for export to countries in the region, which would be a major stimulus for the industry and have a

very positive impact on the nation's finances. Nevertheless, we cannot run the risk of being branded inefficient. The trend in the world is towards larger reactors, ones over 1,000 megawatts. A 600 megawatt reactor at our fourth nuclear power plant could be an intermediate step towards that goal. In any event, I would like to clarify that we are carefully studying what the cost ceiling is for promoting exports in this area.

[Question] Are there labor problems in the CNEA?

[Answer] No, the situation is completely normal.

[Question] Do you have any final thoughts, to sum up?

[Answer] I want to underscore that the Nuclear Plan is thoroughly consistent and to add that safety aspects have not been neglected. The program is consistent because the power plants are rendering a major service in the field of electric power generation and, at the same time, are promoting our independent technological development, which, as I said before, we must preserve at all costs.

8743
CSO: 5100/2139

YRIART FOCUSES ON ENVIRONMENTAL IMPACT OF NUCLEAR ENERGY

Buenos Aires ENERGEIA in Spanish No 46 May 84 pp 57-58, 72

[Interview with Alberto Kattan, prominent environmentalist and founder of the Ecology Workshop of the Political Participation Center of the Radical Civic Union (UCR), by Martin F. Yriart; date and place not given]

[Text] The environmental impact of nuclear energy is an issue that will inevitably become more important in Argentina. First of all, because after a lengthy period of "behind the scenes" development, nuclear power and, in particular, nuclear power plants and the plants involved in the various stages of the nuclear fuel cycle are a tangible reality today, which was not the case just a decade ago. Moreover, their numbers will increase, albeit at a slower pace that we might have expected.

Furthermore, concurrent with the democratic opening, which encourages a public discussion of all current problems, a growing awareness about nuclear power has developed, and although many regard it as superficial and biased, it marks the inception of a necessary and prudent response.

Below, Martin F. Yriart interviews Radical Party attorney Alberto Kattan, one of the best known leaders of Argentina's environmental movement, the founder of the Ecology Workshop of the UCR's Political Participation Center and a pioneer in the development of legal action techniques in defense of the environment and animal species.

Kattan's stand on nuclear power is certainly not typical of the ecology movement, as we will see, and has earned him the label "rational" environmentalist. Whether you share his views or not, his rational approach unquestionably represents an indispensable

bridge between two genuine concerns in our country today, the development of our peaceful nuclear potential and the preservation of the environment and our natural heritage.

[Question] Kattan, what does nuclear power mean in Argentina today from the standpoint of ecology?

[Answer] Ecology became an issue in the world as a result of concern over the adverse consequences of European-style hyperdevelopment. The strong feeling that pollution and overconsumption would soon exhaust natural resources made people realize, on humanistic grounds, that new ways of managing those resources had to be urgently developed. This is what ecology essentially is.

But environmentalism came to our shores because underdeveloped countries always tend to imitate the habits and customs of the dominant nations. So, just as rock and other trends have come, this ecological world view arrived at the shores of Latin America. This movement poses problems for us, however, because our culture is not one of waste and devastation carried out in the name of immediate privileges. Our culture is a servant of others' welfare.

At the very least, it was not in keeping with our socioeconomic reality to raise the banners of asceticism, lower energy consumption and a diminished use of natural resources on an underdeveloped continent like Latin America, where there is hunger and which has all of the features of underdevelopment.

[Question] It is almost a macabre paradox, isn't it?

[Answer] The upshot is that environmentalist proposals are not accepted by the political parties that have traditionally been strong in Latin American politics. The standard-bearers of those foreign ideas had to create their own groups in Argentina, the so-called "green" parties, where a number of initiates meet and, promoting ideas that seem esoteric and exotic to us, try to come up with answers to alleged problems that unquestionably have little to do with our domestic situation. This to me is the problem with the "green" parties.

[Question] Within this context you have voiced serious criticisms of and objections to nuclear power.

[Answer] The problem of nuclear power is, by definition, simply the problem of energy.

The techniques of growth that the developed world seeks to spread throughout the underdeveloped world depend on the accumulation by certain social classes of certain goods, most of them extravagant, that because of the way they are produced only serve to further strengthen the bonds of dependency.

I am in complete disagreement with this approach based on the accumulation of goods, irrational energy development and higher income for certain tiny groups, with this type of growth that makes the accumulation of goods an end in itself. I maintain that well-being is not achieved by accumulating goods.

Starting with a base of certain minimal conditions that are needed for a decent life and that involve the accumulation of certain goods (a base that the majority of the Argentine population does not yet enjoy), we must create other lifestyle expectations that go beyond just accumulating goods, in particular the potential for cultural development and concerns other than just the chrome on a bigger or smaller car or a bigger or smaller air-conditioner or some such thing.

[Question] So, if we accept that a minimum level of well-being has not been achieved and will not be achieved with a redistribution policy, then neither are we providing enough energy so that the populace can enjoy that minimum level, which means that we have to boost the supply of power per inhabitant...

[Answer] Of course That is the role that energy development must play in Latin America and in the Argentine Republic in particular. The goal of consuming half as much energy as the European nations consume is not an extravagant one. And we in Latin America are far below that percentage.

[Question] By a factor of 10...

[Answer] That's right. But the limit is set by the refusal to make consumption supreme. I am not in favor endless supplies of energy for no reason. This is the limit to energy requirements. And why must nuclear plants meet those requirements? Because other power generation technologies have not been discovered, and the needs of growth have to be met while traditional fossil fuels are becoming depleted and while renewable energy sources have not yet been developed on an economically acceptable scale. (This transition period between the depletion of one set of resources and the development of others, which we are in now and will be for a few more years, is the time for nuclear power.)

[Question] Many ecologists say that we should already have available the technologies of solar, wind, biomass power, etc and that we do not because nuclear power has diverted funding from them.

[Answer] This is not an exclusively Argentine problem. It exists all over the world, because nowhere has solar power been developed on a mass scale.

[Question] What do you think about the future availability of this technology? Is it in our immediate or intermediate future? Is developing these technologies simply a question of money, or is something else involved?

[Answer] I think that it is just a question of timing and money. I think that once the political decision has been made to spend the money, the renewable energy sources, wind power in particular, can be developed without further ado.

[Question] Environmentalists are harshly critical of nuclear power, which they view as posing very specific dangers to man and the environment.

[Answer] I think that the criticism of nuclear power stems from the foreign attitudes of the ecology movement in Argentina, which has not yet discovered a characteristically Latin American approach and language.

The nuclear problem in Europe, which is where the antinuclear movements began, is much different from the nuclear problem in the underdeveloped world. In Europe, nuclear technology is too closely related to war, missiles, international disarmament treaties, for a clear-cut distinction to be made between the peaceful and military use of the atom.

Fortunately, we are not in that situation. I contend that the ecology movements are against nuclear power for two reasons: they do not realize that Europe's environmental movements are not geared to Argentina's requirements (this is generally called the "culture of foreign domination"), or certain groups that have traditionally tried to keep us dependent are raising the banner of environmental protection in a completely paranoid way to prevent our independent development.

[Question] We have two nuclear plants in operation today; another is under construction; there is talk of a fourth; a reprocessing plant is being built, and almost the entire nuclear fuel cycle is ready. What future does nuclear power have from an ecological standpoint? What should be done with it and what should we expect?

[Answer] I contend that energy resources have a definite role to play in helping us achieve the level of growth that we still have to reach, as I pointed out in an answer to a previous question. That is the role of energy. The role of nuclear power in particular is to replace conventional or nonconventional energy sources, whether because the former are running out or because the latter, which are renewable, have not yet been developed.

Nevertheless, it would be wishful thinking to deny the adverse impact of all energy generation, nuclear power in particular. I maintain that a body to monitor the environmental impact of nuclear technology should be set up, one that is not under the CNEA [National Commission for Atomic Energy] so that we do not suffer from the regrettable flaw of authoritarian systems in which an organization polices itself. Consistent with the best republican approach, we should have an independent watchdog for nuclear technology and its impact on the environment.

[Question] Do you think that the Executive Branch, which is also in charge of the CNEA, is qualified to perform that function?

[Answer] I realize that it is extremely difficult to set up such a body, because qualified personnel are lacking. I contend, however, that in a few months or in a couple of years at the most the CNEA will be able to let go of some of its staff, as others are gradually brought in, and that this staff could join the new organization.

[Question] But wouldn't it still be under the Executive Branch? Wouldn't the fact that the CNEA also comes under the Executive Branch somehow hamper the new organization from fully discharging its regulatory role?

[Answer] I think that it should share the regulatory role with the legislature. But the function of watchdog should belong to the president of the republic, even if he is ultimately in charge of the CNEA as well. As far as technical policy decisions are concerned, Congress should be involved too. But we are no longer talking about environmental impact here, are we?

[Question] No, but monitoring of nuclear activity enables its environmental impact to be controlled.

[Answer] Political and administrative decision-making ought to be shared with Congress, and another body should monitor environmental impact.

[Question] Shouldn't such a body be independent, like the Judiciary?

[Answer] I don't think that it's that much of a problem. On the basis of that approach, we would have to give the same sort of independence to the bodies that monitor hydroelectric plants or any other equally dangerous activity. I want to stress this point: energy generation is polluting, and nuclear power is no less contaminating than other forms of energy, but your question implies that nuclear energy is more polluting, which I refuse to accept.

[Question] Yet elsewhere in the world people who live near where nuclear power plants have been or are going to be built feel that they are entitled to a say as to whether such activities should take place next to their homes, and this has led to the creation of systems of direct consultation, compulsory information channels, etc.

[Answer] It is true that nuclear power is different from other forms of energy because of the magnitude of the consequences in the event of an accident. A nuclear accident would be more damaging than the crumbling of a dike. It is also true, however, that the environmental damage that a dike causes, even if there is no accident, is greater than the damage that a nuclear power plant causes to the environment under the same circumstances.

I maintain that people make these demands and require such consultation when a nuclear plant is scheduled to go up near them because in Europe people's minds are on nuclear war and the dangers of military installations.

And then there is also the adverse publicity from groups that want to monopolize nuclear technology and make it sound mysterious and extraordinarily dangerous. The fact is that in Latin America, in light of the experiences that we have today in Brazil, Peru and Argentina, such fears have not yet appeared, precisely because here nuclear power has nothing to do with the threats of war that are felt in the United States and Europe.

[Question] The Radical administration has announced new nuclear legislation. Are environmental considerations included in it?

[Answer] The nuclear watchdog issue is given particular consideration. The Radical Civic Union is not especially concerned at present about environmental problems, though the issue was incorporated into its platform. It is perhaps the only traditional party that has clearly made the issue part of its platform, but we have to admit that even now, 6 months into its administration, it has not really taken clear-cut action on the environment.

[Question] What should such action include?

[Answer] I contend that Argentine environmental policy has several priorities, including the study and enforcement of measures that cannot be put off. We must take a look, once and for all, at how we are using our lands. We must draw the proper conclusions from the strange circumstance that we have built what until recently was Latin America's largest city on the most fertile land in the region. We must draw some conclusion from the persistent flooding throughout the Parana-Paraguay basin and take the appropriate infrastructure decisions. We must make clear-cut decisions about the quality and timing of our agricultural output. And we must perhaps decide whether or not we should be dependent on the foreign technological packages called "agricultural chemicals," which affect the quality, timing and marketing of our farm output. We must make decisions about the environmental and industrial development of Patagonia. We must make decisions about fishing regulations and about the particularly serious issue that Traverso brought up in recent days, the depletion of our fishing resources by foreign firms. In short, the party in power has not yet made clear-cut decisions on any of these sore points.

[Question] With regard to nuclear energy and the environment, do you think that Argentine society is sufficiently well informed about nuclear power to be able to live safely with it?

[Answer] I suspect that in the coming months we are going to see serious conflicts in our major cities as these foreign-influenced groups hoist banners of paranoia about nuclear energy to condition our development. This is a problem that has not yet hit home with our people, and I hope that it doesn't. This does not prevent me from asserting, however, that our people are not properly enlightened as to the advantages, limitations and features of nuclear power, and I think that this is attributable entirely to the CNEA, which has not yet gotten past the

inicial stage that characterizes all nuclear-power organizations: the strictest secrecy about all its activities. I think that with the advent of democracy this secrecy approach should be done away with and that the legislature should become involved in supervising the CNEA's management and that a separate institution should be set up to study environmental impact.

[Question] And what action should be taken vis-a-vis the population?

[Answer] I think that grassroots consultation channels should be set up with the people living near existing or future nuclear plants. The CNEA should open its doors to the people and to the mass media and speak clearly and straightforwardly so that everyone understands the problem of nuclear power. The CNEA and the private and government firms involved in nuclear power should undertake an aggressive campaign to educate our people about nuclear power so that the deception practiced by its enemies does not wind up creating confusion that would be damaging to the entire society.

8743
CSO: 5100/2139

CALS ON ANGRA PROBLEMS, LASER BEAM ENRICHMENT PROCESS

Rio de Janeiro JORNAL DO BRASIL in Portuguese 7 Jul 84 p 17

[Text] Minister of Mines and Energy Cesar Cals explained the frequent problems in the Angra-1 nuclear plant. For over a year it has not been operating regularly at full capacity, because people in the coutnry are not used to operating "compact model" nuclear plants, such as the one sold by Westinghouse, and because of problems in importing spare parts.

Following a speech at the Advanced War School, where he spoke about the work of the mining sector in recent years, the minister analyzed the status of the Brazilian nuclear program, explaining its backwardness as part of the adjustment being made by the sector of the economy of which he is in charge (mining and energy).

Although he acknowledged that the Angra-1 plant has "various problems in all fields, except the nuclear one," Cals guaranteed that it would be operating commercially by the end of 1984.

He announced that the National Nuclear Energy Commission (CNEN) is doing research on another uranium enrichment process, with a view to improving the program's operations.

According to the NUCLEBRAS expert, the process involves enriching uranium with laser beams, a technique that was first developed in the country by Campinas University, the Energy and Nuclear Research Institute and the Aerospace Technology Center (CTA) in 1975. Research was also done by the Institute for Advanced Research and by the Energy and Nuclear Research Institute.

There are only two processes for enriching uranium for industrial use--gaseous diffusion and ultra-centrifugation. The first is very widespread in the United States and the Soviet Union, and the second in western European countries. The enrichment process using a centrifugal jet, the patent for which is owned by Nustepe, a company with German and Brazilian capital, is still being developed in a pilot plant. By the end of year, the first industrial plant phase better known as the "first cascade," should be ready for preliminary testing.

The other processes, which are still undergoing scientific research prior to laboratory testing, are the following: laser, plasma, helicon and chemical.

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CSO: 5100/2122

INSUFFICIENT FUNDS HAMPERING NUCLEAR SUBMARINE PROJECT

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 12 Jul 84 p 2

[Text] Brazil is in a position to develop a project to build a nuclear submarine. What it needs are financial resources, but by the beginning of the 1990's, the project will be realized, according to a report made yesterday by Admiral Paulo de Bonoso Duarte Pinto, commander of naval operations.

Teh Admiral emphasized the "fact that Brazil is not interested in nuclear weapons, but in using nuclear technology, to achieve the advances that current technology offers." According to him, the Navy is already training manpower specializing in nuclear technology for the project.

Admiral Bonoso acknowledged that the project to build a submarine in West Germany and another similar one in the Naval Arsenal in Rio de Janeiro "will help make the nuclear submarine project viable."

"Without a doubt, the fact that we are acquiring a new technology for building conventional submarines is a first step for making further advances, i.e., for building a nuclear-propelled submarine. The German submarine project is pavign the way for many things. What will change is the engine, which instead of being a diesel, will be nuclear-powered," the admiral said.

Admiral Bonoso emphasized the "unity of the Navy, which is dedicated to its profesional activities." He acknowledged that "in view of the mission it has to fulfill, the Navy has rather limited naval power, but the little it has is well administered."

The commander of naval operations admitted that budget restrictions limit their ability to renovate equipment, "but everything is being done to enable the Navy to fulfill the professional duties." He cited the four corvettes that are to be built with modern equipment,including missiles, and "the capacity of the Brazilian naval fleet, and particularly the Navy Arsenal, which today is capable of building various types of war ships."

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CSO: 5100/2122

NUCLEMON STEPS UP MINING ACTIVITIES IN MONAZITE AREA

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 20 Jul 84 p 22

[Text] NUCLEMON, a subsidiary of NUCLEBRAS for the production of heavy sands (known as monazite sands), is stepping up its mining operations in the Barra de Itabapoana region, in the north of the State of Rio, as a result of an increase in the value of the Tipity deposits. Consequently, there has been considerable truck traffic carrying ore to the plant for initial processing in Buena, Municipality of Sao Joao da Barra (RJ), which return loaded with sand to replace the mined land. This replenishment makes it possible for the owner of the land to resume the activities he was conducting previously in the area without any problems, after the minerals are extracted.

Although the deposits in the region have been mined for over 40 years, technological development and market conditions are making it possible to mine areas which previously were regarded as uneconomical. This has led to a constant revaluation of reserves and new plans for mining. The reactivation of the Tripity mine, together with the manual extraction of other mineral deposits closer to Buena, has enabled NUCLEMON to increase its overall production. It is making investments to expand the capacity of its sand factory in Buena. The firm is also planning to build an industrial unit in Campos, where it has already bought land in Codin (an industrial district). At the Buena plant, NUCLEMON separates the minerals extracted from all the deposits located along the beaches in the northern part of the state of Rio and south of Espirito Santo.

NUCLEMON separates out four main elements from the ore: ilmenite, black in color, and extensively used in pigments abrasives, iron alloys, etc.; rutile, red in color, used in the electric welding industry; zirconite, cream-colored, which is processed at the NUCLEMON plant in Sao Paulo to produce various derivatives to be used in the optics, glass, chemical and metal-working industries, among others; and, monazite, a honey-yellow color, which is processed in the Santo Amaro plant to produce chloride, oxide and fluoride of rare soils, trissodic phosphate, and others.

9805
CSO: 5100/2122

PRC NUCLEAR DELEGATION VISITS ANGRA PLANTS

PY271250 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 25 Aug 84 p 27

[Excerpt] The vice minister of the PRC State Economic Commission, Lin Zongtang, who is responsible for question related to nuclear energy use, along with other PRC nuclear sector authorities, visited several units of Brazilian Nuclear Energy Company [Nuclebras] last week. This visit by an official PRC mission to Brazil is the first effective step in the nuclear cooperation program between the two countries that was signed last week by the respective foreign ministers, which program emphasizes the peaceful uses of nuclear energy.

The PRC delegation visited the construction sites of the Angra II and Angra III nuclear plantsin the Angra dos Reis municipality, Rio de Janeiro State, where they were met by Nuclebras President Dario Gomes, Director Supertendent of Nuclebras Engineering Inc (Nuclen) Ronaldo Fabricio, and Director Superintnedent Nuclebras Nuclear Central Construction Inc (Nucon) Jarbas Novaes. The Chinese also visited the Nuclebras Heavy Equipment Construction (Nuclep) factory in Itaguai, Rio de Janeiro State, where they were welcomed by Director Superintendent Alfredo do Amaral Osorio. The Chinese also visited the Nuclebras Industrial Complex at Resende (CIR) in the municipality of Resende, Rio de Janeiro State.

The delegation also went to Sao Paulo where they visited Confrab, one of the national companies that manufactures equipment for the Brazilian nuclear plants on orders from Nuclebras.

They visited yesterday the Nuclen offices in Rio de Janeiro to learn about the activities of this subsidiary, which is involved in nuclear plant engineering.

One of the delegation's members, engineer Lian Peisheng, went to Belo Horizonte yesterday to visit the Nuclear Technology Development Center (CDTN) of Nuclebras, which has been created for the purpose of assimilating technology transferred under the Brazilian-FRG nuclear agreement before that technology is passed on to the national industry. The objective of the CDTN is to develop our own technology regarding methods and processes to be applied in the area of reactors and in units of the so-called nuclear fuel cycle.

CSO: 5100/2140

URANIUM CONCENTRATES PLANT PLANNED IN ITATAIA

PY070040 Sao Paulo FOLHA DE SAO PAULO in Portuguese 1 Sep 84 p 10

[Text] Belo Horizonte--The Norberto Odebrechet Company, Inc, which is associated with the French group Pechiney Usine, is holding negotiations with the Mines and Energy Ministry for the installation of a semi-industrial plant to produce 50,000 tons a year of uranium concentrates in Itataia, in the interior of Ceara State. In Itataia there is a deposit which has more and higher grade uranium than the Pocos de Caldas mine in Minas Gerais State.

This information was released on 31 August in Belo Horizonte by Mines and Energy Minister Cesar Cals, during a visit he paid to the Nuclear Technology Development Center (CDTN) of Nuclebras. Cals explained that all the investment for implementing the project. which is budgeted at $50 million or nearly 110 billion cruzeiros, will be made by the Odebrechet-Pechiney consortium. Afterward, Nuclebras will pay back the investment by supplying part of the production of the semi-industrial plant in Itataia.

Cesar Cals said that the government's intention is to sign a contract as soon as possible, ancitipating that the project will start operation by mid-1986, in 1 and 1/2 years at the most. The project anticipates the transportation of the uranium concentrates produced in Itataia, with uranium grade between 90 and 92 percent, to facilities in Santa Catarina State, where the uranium will be recovered by the "solvent extraction" method, with the production of by-products like phosphoric and sulphuric acids, which will be turned over to Petrofertil to be marketed for fertilizers.

The reserves of the Itataia uranium mine have been analyzed by the CDTN of Nuclebras since 1977. At the CDTN, Cals learned about the positive results of the assay of samples from the Itataia mineral and also about the production, at laboratory level, of uranium concentrates. During a press conference, Cals denied that the production of highly concentrated uranium, 99.999 percent pure, by the Nuclear Research Institute of Campinas and the Aerunautics Technological Center has a military goal. Sidestepping a more definite reply, Cals simply said that the production will be destined for "energy consumption."

Cals said that he disagrees with the opinion of the Liberal Front presidential candidate Tancredo Neves that the nuclear agreement must be reviewed. According to Cals "the nuclear agreement at this time is developing as much as Brazil can and must pursue it. It is being implemented precisely within the technical capabalities that exist, geared exclusively to harness nuclear technology." In Cals' understanding, the agreement must be preserved if only because uranium will be "extensively used for energy purposes in many countries of the world, including Brazil, beginning by the year 2000."

CSO: 5100/2142

BRIEFS

ANGRA I RESUMES TESTS--The Angra I nuclear powerplant, which had been halted due to a malfunction in one of its transformers, was once more subjected to tests and by to the end of this week should be operating with a hot reactor, burning uranium, it was revealed yesterday by sources of FURNAS [Electric Powerplants], the company responsible for operating the first Brazilian nuclear powerplant. If the preoperational tests to which the plant will be subjected are successful, the technicians believe that it could be connected into the system supplying electric power to the southeastern region next week. The Angra I plant has an output of 626,000 kilowatts, which is nearly 5 percent of the power existing in that region today. The last time Angra I was stopped it was due to a malfunction in one of the transformers of its substation built by Westinghouse. The equipment was sent to the United States where it will be repaired and in its place FURNAS installed a Tulsa transformer made in Brazil with an identical output of 138 kv. [Text] [Sao Paulo O ESTADO DE SAO PAULO in Portuguese 16 Aug 84 p 34] 8908

ARMY COMMANDER VISITS NUCLEBRAS--First Army Commander General of the Army Heraldo Tavares Alves yesterday visited the heavy equipment plant of NUCLEBRAS [Brazilian Nuclear Corporations, Inc] (NUCLEP) in the municipality of Itaguai, Rio de Janeiro. He was accompanied on the visit by First Army Chief of Staff Brig Gen Ramiro Monteiro de Castro and 30 high-ranking officers. The director-superintendent of NUCLEBRAS, Gen Jose Pinto de Araujo Rabello, received them at the factory with the directors of NUCLEP, who gave a talk on the activities of that subsidiary. Later the industrial installations of the factory and the production of large parts for the nuclear reactors were shown. Jose Pinto told the visitors that after the vessel of the Atucha II nuclear plant reactor was made, as requested by the Argentine Government, NUCLEP is continuing to build the eight collectors and the three condensers of the Angra II plant and the pressurizer for Angra II, in addition to smaller components for the two plants. Peter Kittelmann, federal deputy of the Christian Democrat Party (CDU) of the FRG, accompanied by Gotz-Alexander Martius of the FRG embassy and by the representative of the Kraftwerk Union (KWU), Wolfgang Breyer, also visited NUCLEP and the work site of Angra II in the municipality of Angra dos Reis, Rio de Janeiro. [Text] [Sao Paulo O ESTADO DE SAO PAULO in Portuguese 4 Aug 84 p 6] 8908

ECONOMIST ON FRG ACCORD--Economist Cesare Giusepe Galvan from the Federal University of Paraiba said yesterday that "the Germans are using Brazil to spread their nuclear technology." According to him, "the Nuclear Accord (1975) was a vehicle for Germany to market its nuclear reactors, at a time when the KWU was experiencing a slow period with the fall in international demand for its products." This reprot was made during a session entitled "Technology and Society--Social Issues," held yesterday morning at the 36th Annual Meeting of the SPBC. Galvan believes that "the Germans always had a relationship with Brazil in the nuclear field, following the pattern of the colonizer and the colony." To illustrate, he cited the attempt to use Brazil as the center for enriching uranium in the beginning of the 50's, a time when Germany was occupied by allied troops and therefore could not enrich uranium on its own territory. "What did the Germans do at that time? They called on Admiral Alvaro Alberto of the National Research Council and convinced him to build an enrichment plant using the ultra-centrifugation process in Brazil. The equipment was shipped to Brazil, but the plan never became operational." We should mention at this point that the German centrifuges remained at the premises of the IPT (Institute for Technological Research) from 1955 until 1982, when they were taken to IPEN [Institute for Nuclear and Energy Research] (current Sao Paulo headquarters of the National Nuclear Energy Commission), where they can still be found today. Finally, Galvan recalled that "the purchase by Brazil of the KWU/Siemens reactors from the Federal Republic of Germany served as a promotional argument which the Germans used to sell other similar reactors. After the Brazilian-German Nuclear Accord was signed, the KWU succeeded in selling similar plants to Iran in 1976 and 1977. [Text] [Sao Paulo FOLHA DE SAO PAULO in Portuguese 11 Jul 84 p 23] 9805

NUCLEBRAS BUDGET--Mines and Energy Miniser Cesar Cals is confident that the NUCLEBRAS budget, fixed at the beginning of the year at 1.74 trillion cruzeiros, will be readjusted at a higher inflationary rate than what is approved for other states--150 percent annually. "It appears that the Planning Secretary has revised it, but I do not yet have the figures," Cals said. Since the beginning of the year, NUCLEBRAS has been asking the Planning Secretariat to revise its budget. During a recent interview, the president of this state enterprise, Dario Gomes, disclosed that if additional funds of 200 billion cruzeiros were not approved, the nuclear program would be paralyzed. [Text] [Rio de Janeiro GAZETA MERCANTIL in Portuguese 6 Jul 84 p 3] 9805

CSO: 5100/2122

CANAL ADMINISTRATOR MANFREDO COMMENTS ON PLUTONIUM SHIPMENT

PA071730 Panama City LA PRENSA in Spanish 7 Aug 84 p 1A

[Text] According to information gathered by DPA in Paris and Washington, several countries are preparing a huge security network for the first maritime shipment ever of 250 kg of plutonium from France to Japan, through the Panama Canal.

According to reports in Paris, the highly radioactive material, which is used to make nuclear bombs, was made at a French nuclear reprocessing plant called La Hague. This material came from nuclear plants in Japan, where it will be returned on a date that has not yet been specified.

So far, the company that operates The Hague plant, COGEMA, has experience only in overland transportation of plutonium, using armored vehicles.

In remarks to LA PRENSA in Panama, Fernando Manfredo, deputy administrator of the Panama Canal Commission, confirmed that he knew about the announced transit of the plutonium shipment through the Panama Canal. He noted that the Commission has no authority to deny its passage.

Manfredo said that Panama has restrictions bearing on the transit of dangerous shipment, demanding special security measures without which the vessel carrying it cannot transit the canal.

He explained that the Commission requires, as a special security measure, that the dangerous shipment transit the canal in broad daylight and on days when there is not too much traffic, to avoid any risk of accident. It also requires that experienced pilots guide the ship across.

According to Manfredo, dangerous cargo includes explosives, gases, nuclear shipments, and the like.

At the present time, only the Suez Canal bans the transit of explosive material.

Three Navies Will Protect the Ship

Paris sources indicated that the French, British, and U.S. navies will protect the ship that bears the plutonium while it is in their territorial waters. In addition, the ship will be watched constantly from the air, to prevent any possible attempt by terrorists to seize the nuclear material.

The three countries' deployment will include warships and naval aircraft with special facilities for protection and attack.

U.S. Legislators Protest

Fifteen U.S. congressmen have protested this shipment, alleging that 189 kg of the total shipment can be used to build 30 nuclear warheads.

COGEMA has indicated that the United States made it a condition that the dangerous cargo must be transported through the Panama Canal, excluding the possibility of taking it via the Middle East because of the political unrest in that region.

Reacting to the numerous protests from U.S. congressmen on Friday, U.S. presidential spokesman Larry Speakes said yesterday in Santa Barbara, where Ronald Reagan is vacationing, that there are no indications that this cargo has been threatened.

The congressmen have also said that the cargo is completely superfluous, inasmuch as Japan, a country with no nuclear weapons, has sufficient plutonium reserves for 4 years.

The United States must give its approval for the transportation of the plutonium because it was originally supplied to Japan by the United States.

CSO: 5100/2127

BHABA CENTER DIRECTOR TELLS NUCLEAR POWER PLANS

Calcutta THE STATESMAN in English 9 Aug 84 p 6

[Text] Twenty-two additional atomic power stations would be set up in different parts of India by the year 2000, Mr P. K. Iyengar, Director of the Bhaba Atomic Research Centre, Trombay, said in Calcutta on Wednesday. He said a committee had already been set up to select the sites for the stations. The committee would also examine the possibility of setting up new power stations at the sites of existing stations by utilizing the available infrastructural facilities, he said.

According to Mr Iyengar, a radiation medicine centre and a sterilization plant for pharmaceutical units would also be set up in Calcutta shortly.

Later, speaking at the inauguration of a new gallery on "Atom" at the Birla Industrial and Technological Museum, he advocated the use of nuclear energy to overcome the present energy crisis. This had become essential as the existing coal and oil reserve would be exhausted within the next few decades, he pointed out.

Mr Iyengar said the use of nuclear energy was not only less expensive but also involved a minimum amount of risk. There had not been any major accidents in nuclear installations in the country, he said. In most developed countries, power was being derived from nuclear energy sources. He said nuclear science, which had immense possibilities, could be beneficial to mankind if it was used in a proper way.

The newly opened gallery on atom showed how nuclear "transmutation" occurred in nuclear reaction or in radioactive disintegration. There are other illustrations on radioactivity, nuclear radiation, isotopes, and on chain reaction in fission. The gallery also displays different types of atomic reactors and different power stations in India and abroad. Several photographs, slides, and charts are used for these illustrations. About Rs 1.45 lakhs were spent for the construction of the gallery, a spokesman of the museum said.

CSO: 5150/0042

OFFICIALS TELL DANGERS OF NUCLEAR WEAPONS

New Delhi PATRIOT in English 10 Aug 84 p 3

[Text]

Speaking at a seminar on "Nuclear Disarmament" on Thursday, Planning Commission member M G K Menon pointed that an "alarming range of capabilities" had been acquired while perfecting the techniques of launching a nuclear bomb. It was possible with intercontinental ballistic missiles and submarine launching ballistic missiles to hit targets from a great distance with inescapable accuracy. The entire planet could be annihilated with a multiple warhead because each head could be targeted independently.

The seminar and an exhibition were organised by the Indraprastha College for Women to commemorate the day when exactly 39 years ago an atom bomb was dropped on the Japanese city of Nagasaki. The college if celebrating its diamond jubilee year.

Explaining to the young audience India's stand, he said an immediate freeze on the existing stockpile of nuclear arsenal, an identical system of safeguards for both the superpowers; immediate suspension of nuclear weapon tests, followed by a reduction in the arsenal were the main steps India had been advocating. Tests were carried out not only for innovations to create more sophisticated weapons, but also to ensure that the existing ones work, if needed at a moment's notice, he disclosed.

Institute of Defence Studies and Analysis director K Subramaniam said that the concept of "controlled nuclear warfare", was merely a false bit of information leaked by the superpowers. Even the most sophisticated communication could not effectively control or guide an SLBM, 500 miles below the sea, once it was leashed, he warned.

Besides, the electro-magnetic pulse, a component released when a nuclear bomb exploded, would completly destroy all electronic and computer controls.

Congress-I MP Karan Singh chaired the seminar. Among the other participants were JNU Professor T T Poulose, Institute of Nuclear Medicine and Allied Sciences director Brigadier N Lakshmipati and Archbishop of Delhi Angelo Fernandes.

CSO: 5150/0044

NUCLEAR POWER INVESTMENT

New Delhi PATRIOT in English 10 Aug 84 p 6

[Text] The total investment required for setting up nuclear power reactors in the next three five-year Plan is estimated at Rs 8,100 crore, the Rajya Sabha was informed, reports UNI.

This includes investment of about Rs 2,000 crore in the seventh Plan, Rs 5000 crore in the eighth Plan and Rs 1,800 crore in the ninth Plan.

The perspective plan drawn up by the Atomic Energy Department envisages setting up of an installed nuclear power capacity of about 4,400 mwe by 1995 and 10,000 mwe by 2000 AD, Minister of State for Atomic Energy Shivraj Patil said in a written answer.

Replying to another question Mr Patil said India has succeeded in developing indigenous nuclear fuel for its fast breeder reactors. He said the fuel would be available in time for the commissioning of the fast breeder test reactor in December this year.

Answering a question on the requirement of heavy water Mr Patil said the capacities of the existing and the planned heavy water plants would ensure self-sufficiency with respect to heavy water for the nuclear power programme.

Mr Patil explained that each operating 235 mwe pressurised heavy water reactor required on an average up to 12 tonnes of heavy water to make up for operating losses.

He claimed that Baroda and Tuticorin heavy water plants had shown significant improvement in their performance. The Kota plant is in an advanced stage of commissioning. Talcher heavy water plant would be commissioned this month.

Mr Patil said during the current year a total of about 70 tonnes of heavy water was expected to be imported from the Soviet Union under the existing supply contract for use in the Kota plant.

CSO: 5150/0045

COUNTRY SAID TO COMPLETE 'NUCLEAR FUEL CYCLE'

Kuala Lumpur BUSINESS TIMES in English 10 Aug 84 p 19

[Article by Prakash Chandra]

[Text]

INDIA can now produce plutonium, making it a full-fledged member of the Nuclear Club.

India's nuclear explosion in 1974 in the Rajasthan Desert shook the world. This time, an announcement by the Bhabha Atomic Research Centre (BARC) in Bombay about completing the "nuclear fuel cycle" was buried in the inside pages of India's major newspapers.

"We have completed the fuel cycle, starting from the mining of natural uranium to the final reprocessing of the spent fuel," said BARC Director Dr P.K. Iyengar. He said scientists were now reprocessing and storing the plutonium for future use. "The technology developed is so useful that plutonium can be put to use in all Indian (nuclear) reactors," he said.

Western analysts here recall the policy of former US President Carter discouraging the completion of the nuclear fuel cycle. In theory, once plutonium is chemically separated from spent fuel of nuclear power reactors, the technology for making plutonium bombs would be within the reach of small nations or terrorist groups. The plutonium, in fact, is preferred in the "small-scale" production of plutonium bombs.

President Carter then tried to deny the technology to non-nuclear weapon states like India which insisted it was interested only in making atomic fuel for peaceful purposes. The London Nuclear Suppliers Club (members: US, Britain, West Germany, Soviet Union, etc) banned the supply of 118 items to countries which had not signed the Nuclear Non-Proliferation Treaty.

The Reagan administration, in turn, tried to impose a "full-scope" safeguards agreement with India. In effect, this opened all Indian nuclear reactors for inspection and submission of all plans for future expansion to the International Atomic Energy Agency (IAEA) in Vienna. It was rejected by India as it infringed on "sovereignty."

BARC's Dr Iyengar explained that the "completion of the fuel cycle is a very sophisticated and lengthy process. It involves various stages, like the preparation of fuel elements and assemblies for use in a reactor. The fuel is burned in the reactor, radioactive by-product is recovered from the spent fuel, and the remaining material reprocessed into new fuel elements."

A US$30 million fuel reprocessing plant is being used by Indian nuclear scientists at Trombay, near Bombay. The plant was built based on American and Canadian blueprints.

The IAEA discourages the diversion of nuclear material to weapons use by monitoring nuclear reactor plants and reprocessing plants where plutonium is chemically separated from spent fuel. Separated plutonium is easily handled and, in theory, could be stolen and used by terrorists.

A typical nuclear reactor produces several hundred pounds of plutonium a year. The commercial-grade by-product is not used in weapons because the amount of irradiation it gets makes it unsuitable for military purposes.

Dr Iyengar said a new fuel has been produced by BARC. The fuel consists of 3 per cent plutonium oxide and 97 per cent uranium oxide. The fuel, called Mox (or Mixed Oxide Fuel), was processed in a 40-megawatt experimental reactor at BARC. All the fabrication of the fuel element was done by Indian scientists.

Scientists say the new fuel gives an output of 14,000 MW days per ton. Initially, the Mox was considered an alternative fuel to the American-built nuclear power station at Tarapur, 100 kilometres from Bombay.

The fuel supply to this station was threatened when the US decided not to provide enriched uranium to India despite an earlier agreement. The French finally came in with the fuel supply.

Fast-breeder

While the Mox may not be used in Tarapur, plans are instead under way to use it in a fast-breeder reactor. Dr Iyengar said that after conducting experiments with plutonium oxide and plutonium carbide "we eventually selected plutonium carbide for the fast-breeder reactor at Kalpakkam." Plutonium carbide has high-breeding property.

One use of plutonium is in commercial nuclear reactors where some of the uranium is converted to plutonium during the fission process and then consumed. In fast-breeder reactors, much more plutonium is produced than is consumed and can provide fuel for other reactors when it is recovered from spent fuel. Large breeder reactors which feed electricity into a grid are now operating in the Soviet Union, France and Britain.

Breeder reactors produce mostly bomb quality plutonium 239, the isotope of choice for bombs (plutonium has 15 known isotopes). Plutonium

239 is preferred because it can be produced relatively cheaper and is lighter. Industrial plutonium 238 is produced by the spontaneous emission of an electron from neptunium obtained in turn from uranium 238.

India's new generation of nuclear power reactors is all patterned on the fast-breeder blueprints evolved by the French. In fact, the fast-breeder technology was developed at Kalpakkam, near Madras, with French technical aid. The BARC is also designing a 500-MW prototype fast-breeder reactor for power generation.

Plutonium, however, is regulated by the IAEA. It is subject to inspection by the IAEA so that it can be used only in a reactor which is periodically seen and certified by IAEA inspectors.

Dr Iyengar also said that experiments have been performed to convert thorium to uranium 233. Thorium is a radioactive metallic element used for conversion to fissionable uranium 233. Thorium is found in vast quantities on the sand beaches of Kerala state and experts have been planning for a long time to use thorium straight away as a nuclear fuel instead of depending on natural uranium.

A small quantity of thorium was put in the outer core of an experimental reactor at Trombay which was designed and built with technical aid from Canada in the early 1960s. Another small reactor, Purnima 2, is now testing the material and studying its technical characteristics. — Depthnews Science

CSO: 5100/4747

ANALYST ON PAKISTAN EFFORTS TO BUILD NUCLEAR ARSENAL

Bombay THE TIMES OF INDIA in English 9 Aug 84 p 8

[Article by Inder Malhotra]

[Text] As was only to be expected, the Pakistan embassy in Washington has issued a rejoinder to Senator Alan Cranston's comprehensive and compelling expose of Pakistan's relentless and by now all but successful pursuit of nuclear capability. The Pakistani brochure, entitled "Setting the record straight", has yet to reach this country. But judging from the extensive excerpts available so far, it says little that is new. It merely asserts yet again that Pakistan's nuclear programme is purely peaceful and accuses Senator Cranston as well as other American "votaries of non-proliferation" of "selective morality" which "picks on Pakistan but takes no cognizance of others who have acquired the capability already."

That, however, is beside the point. The most pertinent thing about the Pakistani document--described by the Pakistani news agency, PPI, as "lucid, concise and convincing"--is that it has been overshadowed by some other developments not entirely unconnected with the clandestine building up of the Pakistani bomb. For instance, just when the brochure was being made ready for distribution officials, a funny thing happened at Houston airport as a result of which our Pakistani friends were caught, so to speak, with their pants down.

A consignment, meant for being airfreighted to Islamabad and labelled "printed material and office stationery", was found to contain sensitive equipment required for use in nuclear weapons triggers! Three Pakistani nationals, who had bought this particular item of "stationery", by paying much more than its normal price and that, too, in gold, were promptly arrested because, having been alerted to their tricks, the FBI had been keeping them under surveillance. They are now facing the charge of having acted illegally to smuggle prohibited nuclear equipment out of the U. S., "at the behest of the Pakistan government."

More Seizures

The seizure at Houston is not the only instance of its kind but the proverbial visible tip of the iceberg. Nor should this be a surprise because the Pakistanis are doing in the grey zone of the U. S. nuclear market today what they have so skilfully and so often done in Europe in the past and continue to do so even

now. In fact, the leader of the Pakistani trio now in custody in the U. S. is known to be a specialist in the kind of bizarre operation for which he has been caught. And state department officials as well as the president of the U. S. Nuclear Control Institute, Mr. L. Leventhal, have gone on record to say that while some other seizures have also taken place--five of them in Canada, incidentally--it is possible that many shipments to Pakistan have gone undetected because "Pakistanis have been all over, using legal, illegal and illicit methods to get whatever they need to augment their weapons programme." These sources have added that nuclear equipment needed by Pakistan continues to move there from the West via Turkey, usually under the auspices of French and West German companies evidently out to make a fast buck.

All this is but one part of the stupendous Pakistani effort to build a nuclear arsenal by hook or crook. Another is illustrated by the presence of the Chinese nuclear experts at the clandestinely built uranium enrichment plant at Kahuta near Islamabad which has intensified U. S. suspicions that the Chinese are helping the Pakistanis to develop the trigger mechanism that would enable them to build a reliable and usable bomb without necessarily having to test it.

Quite clearly there is a Pakistanti quid for the Chinese quo. Beijing perhaps hopes to learn from Islamabad the latest centrifuge technique for enriching uranium that Dr. A. Q. Khan, the leading Pakistani nuclear scientist, often called by his countrymen as "our Oppenheimer", purloined from the Almelo plant in Holland.

No wonder Senator Cranston and other leaders of public opinion in the U. S., concerned over the Pakistani nuclear quest, have redoubled their efforts to forge sanctions against it. The senator for California indeed hopes to get during the next week or so bipartisan support for his move to stop the supply of F-16s to Pakistan until it halts its nuclear weapons programme. As he told a meeting of nuclear experts and Congressmen on Friday, he saw no point in using the American taxpayer's money to "subsidise" bomb building by the Pakistani military regime.

U. S. Attitude

Whether he is right in claiming growing support for his approach on Capitol Hill remains to be seen. But it is evident that his views are not shared by the Reagan administration.

Mr. William Schneider, undersecretary of state for security assistance, who was present at the meeting convened by Senator Cranston was at pains to point out that the suspension of the sales of F-16s or other military supplies would be, to use the peculiarly American expression, "counter-productive". It would, he argues, drive the Pakistani government to take the very plunge the proposed sanction wishes to prevent it from taking.

Now, the argument that the U. S. military supplies and economic aid, by taking care of Pakistan's security concerns, would dissuade it from embarking on the nuclear path has been the ultimate in fatuity since it was first trotted out by Mr. Schneider's predecessor, Mr. James Buckley. Far from slowing down the

Pakistani nuclear pursuit it has accelerated it. But there is no escape from the fact that this remains the official line of the Reagan administration which can be depended upon therefore to do all it can to avoid any upset in the present U. S.-Pakistan relationship regardless of how far and how fast Pakistan's nuclear weapons programme proceeds.

This, interestingly, and significantly, is the theme also of a very important article on the subject in a Pakistani magazine. The article, under the expressive heading, "The bomb we must have", is in fact the most forthright and, in some respects, most cogent exposition of Pakistan's motivation to go nuclear. The very fact that the article has appeared in the weekly MAG, belonging to the influential chain of publications, headed by the daily, JANG, and has been penned by one of the owner-editors of the group, Mr. Wajid Shamsul Hasan, speaks for itself. And its publication at this juncture cannot possibly be fortuitous.

The truth is that ever since the Pakistanis went public about their acquisition of uranium enrichment capability, their flat denials of any nuclear ambitions have been accompanied by ambiguous and equivocal statements, clearly with a view to spreading uncertainty and confusion about what actually they are up to. It is perhaps as part of this policy of ambivalence that Mr. Hassan's most unambiguous defence of the Pakistani bomb has been put out at this point of time.

Pak View

After declaring that the acquisition of "nuclear technology and weapons" is gradually becoming "synonymous with our survival". Mr. Hasan says that the acquisition of a nuclear device at this stage would "give us self-confidence in the national existence...(and) would be a source of stability in national life". He invokes Kashmir to underline Pakistan's need for nuclear weapons and goes on to add: "Had Pakistan had a nuclear device in 1971, India would not have dared to invade the crucial part of Mr. Hasan's us and dismember us."

From the U. S. point of view, article is: "Whatever hullabaloo may be raised by the United States over our nuclear designs, the Americans at this stage cannot afford to ignore us. They came to support us on their own when the Russians are sitting in Afghanistan, the Americans cannot show their eyes to us or threaten to render us into a horrible example."

It has been said in these columns before and it needs to be repeated that if Pakistan wants to build the bomb, this country has neither any right nor any capacity to stop it from doing so. What passes between the U. S. and Pakistan on this score is their business though it ought to be clear by now that even the Americans are unable to change Pakistan's nuclear policy notwithstanding its great dependance on them for military and political support.

But to say this is one thing and to remain indifferent to what can only be called this country's astonishing insensitivity to the grave implications of the Pakistani bomb for its security and survival quite another. In the U. S. it is not the Zionists who are drawing attention to Pakistan's strides on the road to nuclear capability, as the Zia regime would like the world to believe. The

alarm about Pakistan's nuclear ambitions and achievements has spread to its best friends. In Pakistan itself, there is a well-orchestrated debate and discussion aimed at furthering Pakistani nuclear pursuits of which Mr. Hasan's article is a telling example.

Wholly strange, in the face of all this, is the virtual silence in New Delhi's corridors of power over the issue of the Pakistani bomb which is a matter of life and death for India. Parliament has been in session for over a fortnight now. But the Pakistani bomb--which, let it not be forgotten is also an Islamic bomb, according to its real begetter, Mr. Bhutto--has not received even a fraction of the attention it has in the U. S. Congress.

CSO: 5150/0041

'MEASURED RESPONSE' URGED TO PAKISTAN'S NUCLEAR DEVELOPMENTS

Madras THE HINDU in English 11 Aug 84 p 8

[Editorial: "No Need To Overreact"]

[Text] [Text] For some time now, it has been clear that the Pakistani regime has given high priority to the development of the semi-clandestine part of its nuclear energy programme that is aimed, at the very least, at reaching basic nuclear explosives, or weapons, capability. This effort has been along two alternative routes — one of which is the plutonium reprocessing route — and major progress has evidently come with respect to the uranium enrichment facility at Kahuta and related activities. In notable contrast to the self-reliance of the research side of the Indian atomic energy programme, the Pakistani project has had to acquire in devious ways from abroad some of the electronic and other sensitive items of equipment believed to be essential in providing the trigger device. The closeness of the military dictatorship to a nuclear military capability is suggested by a large body of Western intelligence data as well as the information available with India, to judge by the former Defence Minister, Mr. R. Venkataraman's pronouncements on the subject in Parliament. In Pakistan itself, the official stances have been structured — through a seeming ambivalence — to project the message that while there is, of course, determination to get ahead on the militarily significant side of nuclear energy activity, the intentions of the programme are exclusively peaceful. The most authoritative guidance on the progress comes from Dr. A. Q. Khan, the nuclear scientist known to be leading the effort, who has claimed in an interview that Pakistan has reached uranium enrichment capability and that, if the government so decides, it can make nuclear weapons. In the most recent period, an external complication has been inserted into the controversy by the allegation, especially in the U.S. Congress, that China has been persisting with its help to Pakistan's clandestine nuclear activity. There can be no question that the development poses vital and potentially grave issues from the standpoint of India's national interests. Views have been put forward within the community specialising in strategic affairs and, to an extent, at the political level suggesting that there has been complacency in the national response; and a circular letter sent out by Mr. Krishan Kant (Servants of People Society) raises questions that tend to lead in the direction of proposing that India must decide right now on a major change in its nuclear policy and give up its commitment to exclusively peaceful, non-military uses.

The debate cannot be dodged nationally, however unwelcome the issues are to the votaries of "non-proliferation" in the West. However, an objective consideration of the developments in the sub-continent and in the region would seem to suggest that the existing framework of national policy on nuclear energy is quite capable of taking care of the new and changing elements in the picture. For one thing, India has not tied its hands or foreclosed its options — beyond affirming, correctly, its commitment to the exclusively non-military or peaceful purposes of nuclear energy under the present set of circumstances. It has refused to accede to the blatantly discriminatory global nuclear bargain and to the Nuclear Non-Proliferation Treaty and, despite pressures and some vacillations introduced into the national policy from time to time, has preserved intact its sovereignty and independence of action. It would obviously be compromising the national interest to give up the right to change the course, or to exercise unwelcome options, in the future if the situation so requires. Realism would make it clear that once Pakistan becomes a nuclear explosives or nuclear weapons power — even before it develops a major arsenal or a sophisticated delivery capability — there can be no preventing India from saying goodbye to its historical commitment against the military application of nuclear energy. On the other hand, there is no need to jump the gun and behave as if the strategic environment has already been perilously and sensationally transformed. There is nothing much India can do, at this stage, to cancel out its neighbour's progress on the research and militarily significant side of its nuclear energy programme; nevertheless, it must study the developments precisely and deeply and work out a measured response. Quite independently of these developments, the time has surely come to overcome on a priority basis the one major, policy-dictated weakness in what is otherwise a comprehensive nuclear energy venture — the absence of a facility capable of producing significant quantities of enriched uranium that would improve the nuclear power prospects and also keep other kinds of options open.

CSO: 5100/4745

BRIEFS

FAST BREEDER REACTORS--Fast breeder nuclear power plants would be introduced in the country in the first decade of the 21st century, Minister of State for Science and Technology Shivraj Patil informed the Lok Sabha on Wednesday, report agencies. The fast breeder test reactor was scheduled for commissioning at the Reactor Research Centre at Kalpakkam, in December 1984, he said, in an answer. A feasibility report on the design and construction of 500 prototype fast breeder reactor had been prepared and detailed project report would be ready during the first part of the seventh Plan, Mr Patil said. [Text] [New Delhi PATRIOT in English 9 Aug 84 p 6]

INDO-LIBYAN NUCLEAR ACCORD--New Delhi, Aug. 8 (UNI): The Prime Minister, Mrs Indira Gandhi, disclosed in the Lok Sabha today that the Department of Atomic Energy (DAE) had "some reservations" about the Indo-Libyan nuclear accord signed by the former Prime Minister, Mr Morarji Desai, during the Janata regime. She said in a written reply that the DAE was not involved in the negotiations culminating in the memorandum of understanding signed in July 1978 between Mr Desai and Staff Major Jalloud of the Socialist People's Libyan Arab Jamahriyah. The then industry minister, Mr George Fernandes, was also involved in the negotiations, she added. She said the DAE had reservations on certain provisions of the agreement. Beyond the exchange of scientists, there was no activity under the agreement which has lapsed now, she added. [Text] [Calcutta THE TELEGRAPH in English 9 Aug 84 p 5]

CSO: 5150/0043

COMPANY SIGNS $7-BILLION DEAL WITH PRC

JN300740 Amman THE JERUSALEM STAR in English 30 Aug-4 Sep 84 p 1

[by Pam Dougherty, *STAR* staff writer]

[Text] Amman — Seven billion dollars worth of contracts have been signed recently between a Jordanian company and the Peoples Republic of China for the provision of four nuclear power stations to be completed over the next seven years, *THE STAR* has learned.

In what is undoubtedly the largest contract ever for a Jordanian company, United Trading Company (UTC) of Amman will provide the stations on a turn key basis, informed sources have revealed.

Officials of the company were not available for comment, but the *STAR* has learned that UTC will be the contractors and project managers for the schemes which involve two contracts and will work in conjunction with specialists in nuclear field.

The first contract, which is for one station and is valued at $2 billion, will not include the provision of the nuclear island or the conventional island, which have been the subject of negotiations on China's part with France's Framatom and Britain's GEC for the past three and a half years. The second contract, which covers the remaining three stations and is valued at $5 billion, involves all other elements.

Sources say that UTC has now initiated contacts with several qualified European companies in France, Britain, Switzerland, Germany, Austria, and Sweden. They are reported to have had "keen" response from most and particularly from a potential Swiss, German, Austrian-Swedish consortium but are said to be waiting for a serious response from French and British companies. They are hoping to settle arrangements with a consortium by the end of September after which implementations of the projects could begin.

Negotiations for the deal were handled mainly by UTC's Hong Kong office. Observers believe the deal is a major coup for a company established in Amman as a trading concern only 25 years ago.

Since its establishment UTC has blossomed into an energetic and varied group with offices in 14 countries and interests that range from oil drilling in the United States to prawn cultivation in Malaysia, chicken farming in Thailand and the production of laser equipment in the United Kingdom.

The company is also involved in construction work through its associate, Trans Orient Construction and Engineering Company, Jordan's largest construction company.

UTC's success in gaining the contracts may have been helped by China's anxiety to speed up its overall industrialisation programme. When China launched its programme it quickly realised that it needed a dramatic boost in its power supply and it turned its attention to the possibilities of nuclear power. It began negotiations with British and French interests hoping for a combined offer to build the first station but the negotiations have not as yet yielded results.

During American President Ronald Reagan's visit to China this year, the U.S. agreed to help the Chinese with their nuclear power programme but, in an American election year nothing substantial has transpired. The Chinese then decided to go past the slow moving government-to-government procedure and establish contacts with private companies which it hoped would be able to produce results more quickly.

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POLL MEASURES ATTITUDES ON NUCLEAR POWER

Young Women Most Opposed

Helsinki HELSINGIN SANOMAT in Finnish 15 Aug 84 p 11

[Article: "Young Men Most Supportive of Nuclear Power"]

[Text] Men take a more positive attitude toward nuclear power than women, concludes a study conducted at Tampere University. The highest number or supporters of nuclear power is among very young men between the ages of 15 and 20.

The study conducted at the Institute of Administrative Science is a follow-up analysis of the report "Finnish Energy Policy Opinion", published in January 1984. In the study opinions were solicited from 3,750 people selected completely at random.

The researchers explained the positive attitude of young men toward nuclear power by the fact that the so-called upheaval of values does not necessarily extend to all young men even though it otherwise is associated with the younger segment of the population, in particular.

Among women age determines the attitude toward nuclear power more than among men even if women's views tend to lean toward the negative with respect to nuclear power in all age groups, states the study.

Unlike young men, young women oppose nuclear power more frequently than other people. Among men under the age of 20, 35 percent supported an increase in nuclear power while only 8 percent of women in a corresponding age group supported an increase.

Among this youngest group of women, 64 percent supported a reduction of nuclear power, among men, 26 percent.

On the average, half of the women supported a reduction of nuclear power and 12 percent supported an increase. Among men, 27 percent supported an increase and 26 percent supported a reduction.

As the educational level increases the proportion of those supporting an increase in the use of nuclear power increases gradually.

The emphasis of the attitude toward nuclear power shifts from the negative to the positive among those who have a university-level education and have completed research at the academic level.

Educational level has the same effect on the attitude toward nuclear power among women and men. However, even men with the lowest level of education react more positively toward nuclear power than the most educated women.

Education begins to make positions more positive toward nuclear power after the age of 30. The attitude is quite similar regardless of education in the two youngest age groups or among those under 21 and between the ages of 21 and 30.

The attitude of those with the least education is quite similar regardless of age. Those with little education in all age groups are, on the average, equally opposed to nuclear power.

What is common for all those representing the extreme in opposition to nuclear power is that they are not among the employed according to the study.

Those who express the strongest opposition are the unemployed, housewives, pensioners, secondary students, and university students. The attitude of housewives does not, indeed, differ from the general negative position of women.

Those with the most positive attitude are individuals in management positions, higher-level functionaries, and businessmen.

The traditional leftist--rightist confrontation is not reflected in nuclear power attitudes according to the study. The extremes in attitude can be found at the ends of the Conservative--Green axis. A rough arrangement of party constituencies according to degrees of a positive attitude by parties is the Conservative Party, Center Party, Swedish People's Party, Social Democrats, Rural Party, Christian League, Finnish People's Democratic League, and the Greens.

Age does not seem to have any connection with the nuclear power position in the largest bourgeois parties, the Conservative and Center parties, states the study. On the other hand, age is a perceptible factor in the SKDL [Finnish People's Democratic League] as well as in the Social Democratic Party. In both left-wing parties those under 40 are clearly more opposed to nuclear power than those over 40.

Also youth in the Swedish People's Party and the Christian League are definitely more opposed to nuclear power than the older people. The SMP [Finnish Rural Party] is the only party in which youth are definitely more favorable to nuclear power than the party's older supporters.

The same attitudes among the various population groups also hold true among residents in the vicinity of the nuclear power plants in Lovisa and Rauma as

elsewhere in the country. There have always been more nuclear power supporters, however, in Lovisa, in particular, than the average throughout the whole population.

Paper Analyzes Poll Results

Helsinki HELSINGIN SANOMAT in Finnish 20 Aug 84 p 2

[Editorial: "Nuclear Power Burns Decisionmakers"]

[Text] Indeed, much work has been done in Tampere University to clarify the nuclear power attitudes of the Finnish people. The study, which has just been made public, is a continuation of the examination of energy policy opinions made public in the beginning of the year. It gives a multicolored picture of nuclear power attitudes and an assessment that emotions control attitudes, which is no longer news.

According to the study, emotions become emphasized in the attitudes toward nuclear power as well as in the attitudes toward other people's opinions on it. Those who support an increased use of nuclear power criticize the opponents of nuclear power and call them idealists, obstacles to development, and ignorant. The opponents, for their part, oppose the supporters perhaps even more than nuclear power itself.

Men clearly support the expanded use of nuclear power more often than women and among men the youngest age group of 15--20 years of age has the most favorable attitude toward nuclear power. Those with a higher education or academic training support nuclear power while the uneducated segment of the population, on the other hand, opposes its increased use. The most negative group with respect to nuclear power is comprised of young uneducated women.

Support for nuclear power increases in proportion to age even if those over 60 are ready to adopt an unequivocal stand for or against according to the poll. As the educational level increases, support for nuclear power increases even though those with academic training who vote for the political left represent an exception and oppose nuclear power. Except for Lovisa's Swedish-speaking people and higher academic degree holders who are perhaps protesting the influx of Finnish-speaking people into the community, the population in Lovisa is especially favorable to nuclear power compared to the rest of Finland.

From the study one could come to the conclusion that a binding referendum on nuclear power would mean a preservation of the present situation or an abandonment of nuclear power. If men only were to participate in the vote, increased use of nuclear power would be a probability.

The Tampere study only seems to reinforce prevailing assumptions on people's attitudes toward nuclear power and to reveal the discomforting fact that the decisionmakers must take the responsibility for energy policy decisions even at the risk of losing public approval. However, the study does provide the decisionmakers with a guide for avoiding the worst pitfalls.

There is probably very little that the study did to change attitudes connected with the fear of the unknown. On the other hand, the interest demonstrated by the people participating in the Tampere poll speaks to the fact that a large segment of the Finnish population wants more information about nuclear power in an understandable form. It became clear from the study that the behavior of the electric power companies, which has sometimes been interpreted to be quite arbitrary, continues to arouse the desire to oppose nuclear power. Imatra Power has barged ahead in nuclear power issues with its own arrogance just as it has done with its sister companies in hydropower issues.

The Tampere interviews were conducted last year before the alarming debate about acid rains and the death of the forests became part of public awareness. Thus sulfur pollution and other environmental damage from coal and oil did not yet play any kind of a role in the minds of those being interviewed. When the study was conducted, nuclear power did not yet appear after hydropower to be a source of energy that is more friendly to the environment, cleaner, and safer. Thus the study is already obsolete.

The surprising obsoleteness of the study does not detract from its most important value. Attitudes on energy questions that are so deeply anchored in emotions and a lack or paucity of knowledge come as a made-to-order alarm clock, which should give an impetus to the decisionmakers. As the forests become sick and the harnessing of solar energy is anticipated, at these latitudes inventors must know how to talk objectively about nuclear power.

Conservatives' Leader Backs Plants

Helsinki HELSINGIN SANOMAT in Finnish 17 Aug 84 p 3

[Article by Martti Backman: "Suominen Supports New Nuclear Power Plant"]

[Excerpt] Turku--Conservative Party Chairman Ilkka Suominen threw his own forceful personal support behind the construction of a fifth nuclear power plant at a summer meeting of the party's parliamentary faction in Turku.

"Having become familiar with a rather extensive collection of material in which the various energy alternatives are compared, I have become ever more convinced that the safest and environmentally friendly as well as the most feasible solution in the future is to increase the production of electricity by means of nuclear energy," stated Suominen in giving instructions to the parliamentary faction. The Conservative Party congress has given the party council and the parliamentary faction the authority to make a decision on a new nuclear power plant once the question of waste has been resolved. It is estimated that a definite majority in the parliamentary faction is for nuclear power.

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